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## User Guide

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# TesTORK

Wireless Test Torque System

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Tesco Corporation (“TESCO”) has made every effort to ensure that this document contains accurate and current information for the TESCO Torque Turn System, however, **the document is intended to be used in conjunction with a complete training program and on-site supervision** and TESCO does not warrant or guarantee that the information contained herein is either complete or accurate in every respect, and the reader hereby protects, indemnifies and holds harmless Tesco Corporation together with its directors, officers, employees and agents from and against all liability for personal injury, death or property damage to any person arising directly or indirectly from the use by the reader of the information contained in the document.

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## ELECTROMAGNETIC COMPATIBILITY NOTICE

### FCC

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

### IC RSS 210

*This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

### SAFETY

The TESCO TestORK is intended to be used in locations where hazardous gases may likely be present. It meets the requirements of IEC-60079-11 for use in Zone 1 Group IIB.

**Note: Only units with either a Special Inspection sticker or Model Certification label shall be used in locations where hazardous gases may be present.**

### 4.1.1 IEC 60079-11

THIS EQUIPMENT IS SUITABLE FOR USE IN ZONE 1, GAS GROUP IIB, OR NON-HAZARDOUS LOCATIONS ONLY.



**Warning! EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR ZONE 1.**



**Avertissement! RISQUE D'EXPLOSION - LA SUBSTITUTION DES COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE ZONE 1.**



**Warning! The TESCO TESTORK UNIT MUST ONLY BE ASSEMBLED AND OPERATED BY QUALIFIED PERSONNEL**

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# CHAPTER 1: ABOUT THIS DOCUMENT




## CONTENTS

This document contains the following information for the TESCO Wireless Torque Turn System (WTTS):

- System overview
- Rig up, configuration and calibration
- Operation
- Checklists and general system information

## CONVENTIONS

This document uses signal words and symbols to identify the hazards that a person may encounter while assembling, maintaining, servicing or operating this product.

<p><b>Danger!</b></p> 	Indicates that the situation could endanger the life of the operator or other personnel if procedures are not followed correctly.
<p><b>Warning!</b></p> 	Indicates that the situation could present a serious risk of harm to personnel or severe damage to equipment if procedures are not followed correctly.
<p><b>Caution</b></p> 	Indicates that the situation could cause damage to equipment if the procedure is not followed correctly.
	<p><b>Note</b></p> <p>Indicates additional information that will enable the user to complete the task more easily.</p>

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## CHAPTER 2: SYSTEM OVERVIEW

This chapter provides an overview of the functionality and features of the TesTORK Wireless Torque Monitoring System.

### INTRODUCTION

The TesTORK Wireless Torque Monitoring System was developed by TESCO to complement the TESCO Casing Running Tool (CRT). The TesTORK enables operators to accurately monitor torque vs. turns and torque vs. time when making up connections using TESCO top drive systems. RPM is also monitored.

The TesTORK is wireless in operation and functions independently of other rig equipment. The only connection required is an AC power supply to the base radio.

### Features

The TesTORK provides the following operational features:

- Real time monitoring of torque load applied by the top drive during casing connections
- Torque load is measured against both time and number of turns for each casing connection.
- Operators can define the characteristics of a satisfactory casing connection by entering connection data specifying torque limits, turn values and hold time for the shoulder and peak torque target.
- During a connection attempt, the user interface (UI) displays real time data showing torque load vs. time and torque load vs. number of turns. The speed (RPM) of the casing during a connection attempt can also be viewed.
- A summary of data from the connection attempt is immediately displayed on the UI when the connection attempt is complete
- Connection attempts are identified as being either a pass or a fail. The operator can also identify a connection as being a forced pass or forced fail. Comments must be added to connections identified in this way.
- Information and data defining a job can be specified before a job begins. Information includes company details, casing data, shoulder data and peak torque data values. Some data can also be changed during a job.
- The TesTORK is calibrated to measure between 0-50000 ft-lbs of torque and can be re-calibrated regularly

- The TesTORK makes efficient use of battery life which is continually monitored. To preserve battery life, the TesTORK will enter sleep mode after a period of no communication between itself and the base radio.
- The TesTORK uses an auto hunt mode to establish wireless connection with the base radio

## Data logging and reports

The TesTORK provides the following data logging and reporting functionality:

- Torque, turn and time data for every connection is logged at 100 times per second
- Every connection attempt is logged and the result displayed
- Operators are prompted to enter comments for failed connections. Comments can also be added following a successful connection.
- Logs and displays connection number, casing depth and the reason for every failed connection
- Reports can be generated that provide information on job statistics, section detail or summaries, and connection details (i.e. shoulder torque values, peak torque values and number of turns)
- A connection can be abandoned if two complete turns (or less) are not completed

## Data Configuration

The TesTORK software provides the following data configuration options and functionality:

- Connection data defining the characteristics of a satisfactory casing connection can be changed at any time during a job

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**Note:** The TesTORK flags and logs all changes to connection data during a job.

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- All connection data is saved for future use. This reduces the time required to enter data manually by allowing the operator to reuse similar data from a previous job
- Data is displayed and logged in metric or Imperial units for every connection.

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**Note:** Units cannot be changed during a connection process.

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## User Interface

The TesTORK user interface (UI) has the following features:

- TesTORK software is automatically installed and runs from the client CD; users do not have to manually install the program onto a computer
- Operators can enter data and navigate the TesTORK screens with either a touch screen (only some laptop computers) or mouse click
- Interactive torque vs. time and turns graph reports are displayed enabling the operator to:
  - Use pan and zoom controls to view details at any point on the graph
  - View torque vs. time, torque vs. turn, or torque vs. time and turns
  - Show or hide RPM data by clicking a single button

## HOW THE TESTORK SYSTEM WORKS

The TesTORK system is comprised of the following components:

- TesTORK sub
- TesTORK housing
- Base radio (connects to the computer hosting TesTORK Manager software)
- TesTORK Manager software and host computer

The TesTORK sub is installed between the top drive and casing drive system. Sensors in the TesTORK sub provide torque, tension and rotational data. This data is transmitted to the base radio by a wireless transmitter located in the TesTORK housing. The TesTORK sub and TesTORK housing are a single unit referred to as the TesTORK.

The base radio supplies torque, tension and rotational data to the TesTORK Manager software's host computer.

The combination of TesTORK system components enable the operator to view and log connection data using the TesTORK Manager software's user interface.

See "Appendix C: TTS General Assembly" for the general schematic overview.

## WHAT'S INCLUDED IN THE TESTORK KIT

The TesTORK kit consists of the following items:

- TesTORK with built in wireless transmitter
- Base radio
- Computer
- Custom battery pack.
- Printer with power cord, USB cord, paper and ink cartridges
- USB patch cord

## SOFTWARE OVERVIEW

This section provides an overview of TesTORK software including the main screen and dialog boxes available from the main screen.

### Select Job dialog box

The *Select Job* dialog box appears after starting TesTORK software. This dialog box enables the operator to resume work on an existing job, or start a new job.

Two tabs are available in the *Select Job* dialog box:

- *Existing Jobs*
- *New Job*

#### Existing Jobs

The *Existing Jobs* tab provides a list of exiting jobs and enables the operator to select a job and immediately resume work on that job. TesTORK software saves information and connection data from each job monitored by the software.

**Note:** If no job is selected, the most recent job is automatically restarted when the *OK* button is clicked.

Figure 2-1: Existing Jobs tab

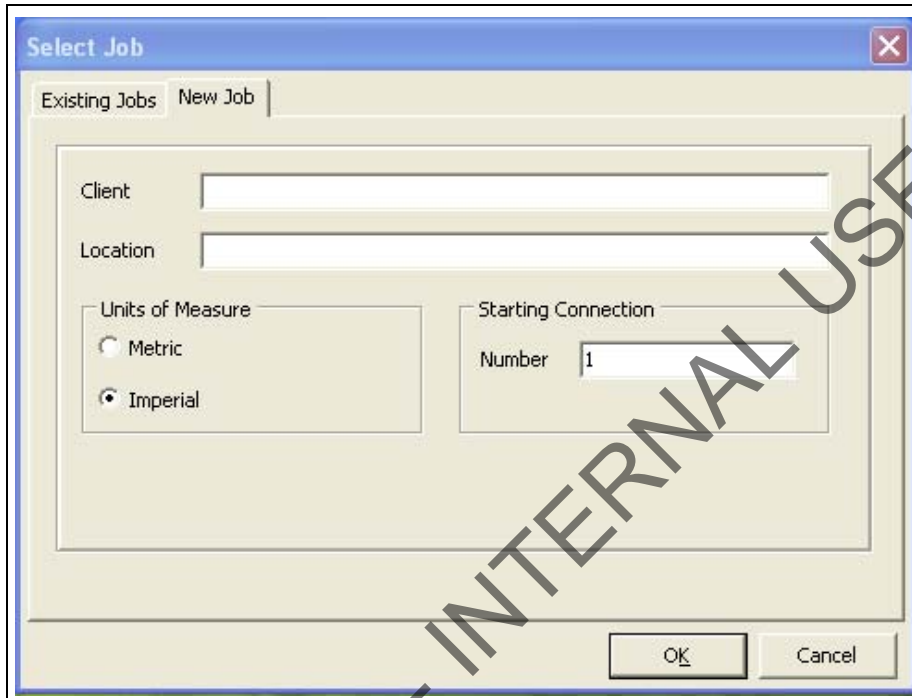




### New Job

The *New Job* tab enables the operator to begin a new job by entering information and connection data that define the job. Information is first entered in the *New Job* tab. The *Create New Job* dialog box then appears enabling the operator to enter further information and connection data.

**Figure 2-2: New Job tab**

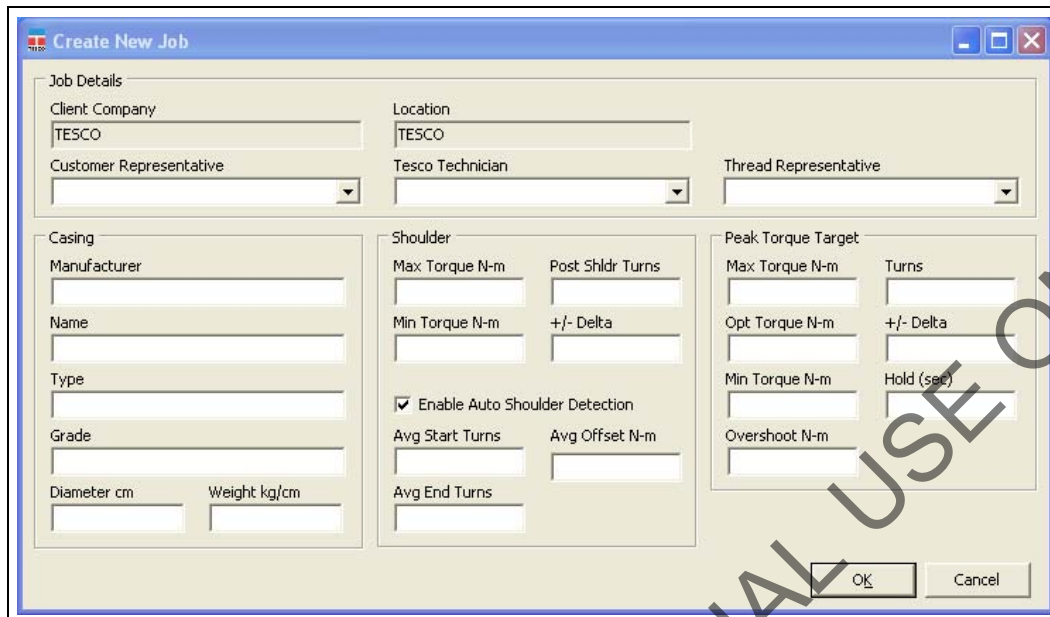


The following items are available in the *New Jobs* tab:

**Table 2-1: Create New Job dialog box**

Group	Item	Functionality	Description
	<i>Client</i>	Text box	Input of text information
	<i>Location</i>	Text box	Input of text information
Units of Measure	<i>Metric</i>	Radio button	Configures all data to be displayed in imperial units
	<i>Imperial</i>	Radio button	Configures all data to be displayed in metric units
Starting Connection	<i>Number</i>	Text box	Defines starting connection number

Figure 2-3: Create New Job dialog box



The following items are available in the *Create New Job* dialog box:

Table 2-2: Create New Job dialog box:

Group	Item	Functionality	Description
Job Details	<i>Client Company</i>	Text box	Displays the name of the company typed in the <i>New Job</i> tab
	<i>Location</i>	Text box	Displays the name of the location typed in the <i>New Job</i> tab.
	<i>Customer Representative</i>	Text box	Representative from the customer
	<i>Tesco Technician</i>	Text box	TESCO technician entering the job and connection data
	<i>Thread Representative</i>	Text box	Independent thread expert
Casing	<i>Manufacturer</i>	Text box	Casing manufacturer
	<i>Name</i>	Text box	Representative from casing manufacturer
	<i>Type</i>	Text box	Type of casing
	<i>Grade</i>	Text box	Steel grade of casing
	<i>Diameter cm</i>	Text box	Casing diameter value. A correct casing diameter value is vital for accurate calculation of RPM. A metric or diameter vale can be entered pending on the units of measure selection made in the <i>Select Job</i> tab.  For information on selecting how units are displayed, see Table 2-1 on page 7.
	<i>Weight kg/cm</i>	Text box	Casing weight value. A metric or diameter vale can be entered pending on the units of measure selection made in the <i>Select Job</i> tab.  For information on selecting how units are displayed, see Table 2-1 on page 7.

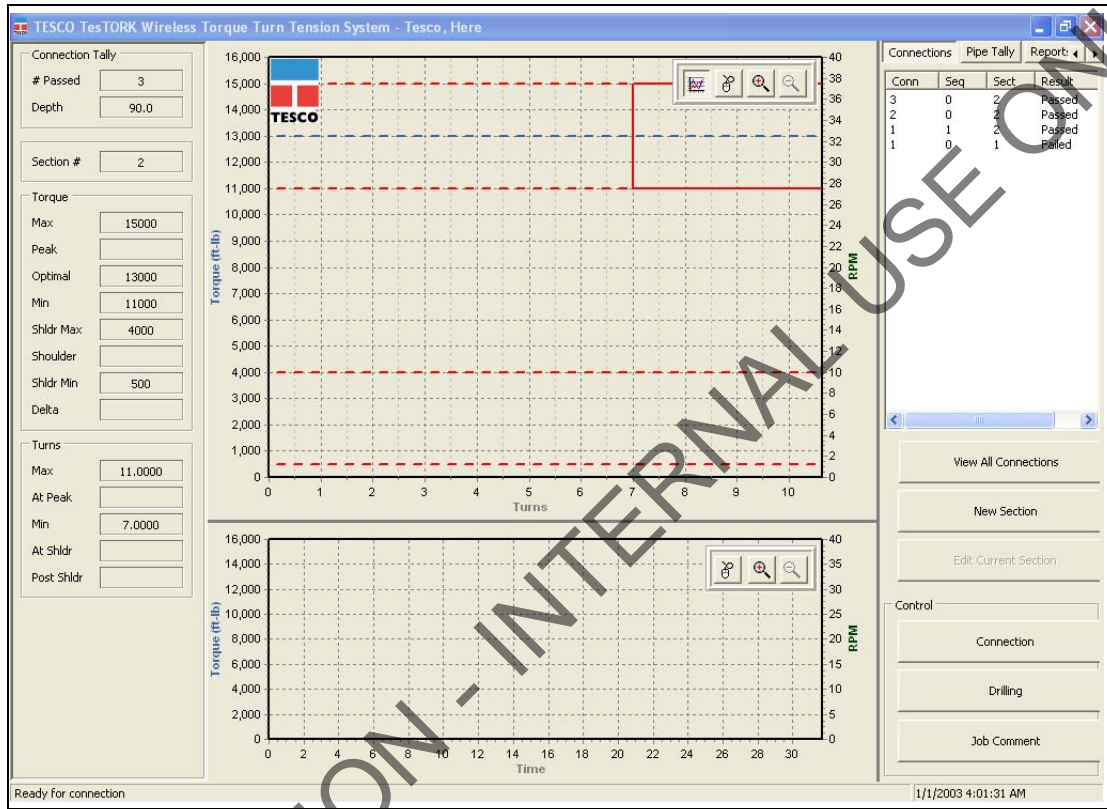
**Table 2-2: Create New Job dialog box:**

Group	Item	Functionality	Description
Shoulder	Test runs are required to determine the number of turns and the shoulder torque value. Use the Stream Check function. For more information.		
	<i>Max Torque</i>	Text box	Maximum post-shoulder target range
	<i>Min Torque</i>	Text box	Minimum post-shoulder target range
	<i>Post Shldr Turns</i>	Text box	The amount the casing should turn after 'shouldering' occurs; this value is typically very low.
	<i>+/- Delta</i>	Text box	Allowable variance for the post-shoulder turn.
	<i>Avg Start Turns</i>	Text box	Sets the turn count that pre-shoulder averaging begins at
	<i>Avg End Turns</i>	Text box	Sets the turn count that pre-shoulder averaging ends at
	<i>Avg Offset ft-lb</i>	Text box	Sets the shoulder torque value above the pre-shoulder average
	<i>Auto-Shoulder Mode</i>	Check box	When the auto-shoulder mode is selected the shoulder point can be moved (manually)
Peak Torque Target	Consult your casing manufacturer for the information used in this parameter group.		
	<i>Max Torque ft-lb</i>	Text box	Maximum allowable torque value. A torque value above this setting results in a failed connection result.
	<i>Opt Torque ft-lb</i>	Text box	Optimal torque value
	<i>Min Torque ft-lb</i>	Text box	Minimum allowable torque value. A Torque value below this setting results in a failed connection result.
	<i>Turns</i>	Text box	Number of turns required to reach peak torque
	<i>+/- Delta</i>	Text box	Allowable variance in number of turns required to reach peak torque
	<i>Hold (sec)</i>	Text box	Time required to maintain the optimal torque setting. During this time, variances outside the optimal torque range result in a failed connection result.
	<i>Overshoot ft-lb</i>	Text box	Increased torque value generated by the momentum of the top drive when the casing connection is fully tightened

Main screen

The main screen appears after starting TesTORK software and beginning a job. The main screen provides access to information and dialog boxes that enable the operator to accurately monitor torque, turns and RPM while making up connections. The main screen also provides access to data from previous connection attempts, reports and hardware configuration options.

Figure 2-4: Main screen



The following items are available from the main screen:

Table 2-3: Main Screen Interface Elements

Item	Data/Notes
Footer bar	Contains connection status information
Data fields on the left side of the screen	Displays number of passed connections, depth, torque values, turn values, shoulder and post-shoulder torque and turn data
Graphs	Display torque (and RPM) vs. turns and torque (and RPM) vs. time Information is displayed in real time as the connection progresses.
Connections button	Provides access to the following dialog boxes: <ul style="list-style-type: none"> <li>•View All Connections</li> <li>•New Section</li> <li>•Edit Current Section</li> <li>•Connection</li> <li>•Drilling</li> <li>•Job Comment</li> </ul>

**Table 2-3: Main Screen Interface Elements**

Item	Data/Notes
<i>Pipe Tally</i> tab	Enables the operator to view a list of all connection attempts
<i>Reports</i> tab	Enables the operator to view and print data section and connection data
<i>Hardware</i> tab	Enables the operator to view hardware configuration information.  Administrators are able to access and configure the System Settings dialog box
<i>About WTTTS</i> tab	Enables the operator to view TesTORK software version information

**Data fields on left Side of Screen**

The following data is available on the left side of the screen:

**Table 2-4: Data fields on left side of screen**

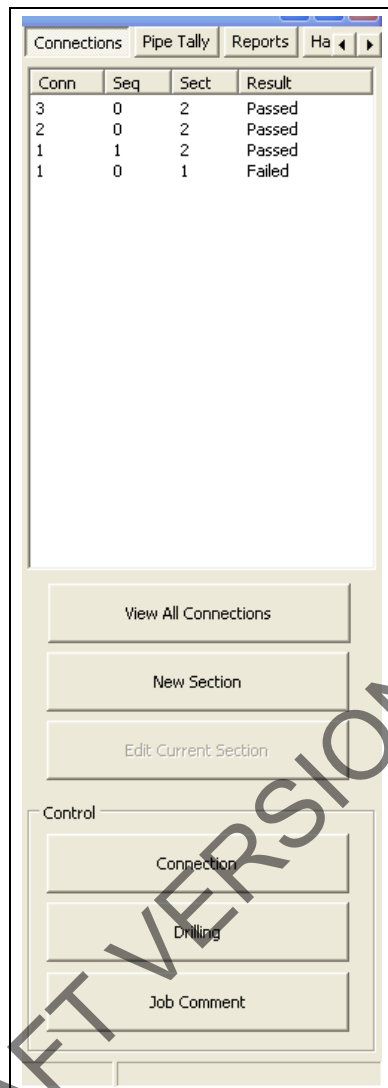
Group	Item	Description
Connection Tally	<i># Passed</i>	Number of connections categorized as being <i>passed</i>
	<i>Depth</i>	Current total depth of casing
	<i>Section #</i>	Every change to job information and connection data creates a new section number
Torque	<i>Max</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>Peak</i>	Peak torque value during a connection attempt
	<i>Optimal</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>Min</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>Shldr Max</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>Shoulder</i>	System or manually defined value
	<i>Shldr Min</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
Turns	<i>Delta</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>Max</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>At Peak</i>	How many turns taken to reach the peak torque value during a connection attempt
	<i>Min</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box
	<i>At Shldr</i>	How many turns taken to reach the shoulder value during a connection attempt. System or manually defined value
	<i>Post Shldr</i>	Value entered in <i>Create New Job</i> or <i>Add New Section</i> dialog box

## Connections Side Panel

The *Connections* side panel enables the operator to access the following dialog boxes and windows:

**Note:** A list of the results from each attempted connection is also displayed when the *Connections* button is clicked.

Figure 2-5: Connections side panel



### View All Connections

Clicking the *View All Connections* button enables the operator to access the *View Connections* window containing details of all casing connections made as part of the current job. The *View Connections* window also features buttons that enable the operator *View Graph*, *View Section* and *Remove Conn* (remove connection).

Figure 2-6: View Connections Window

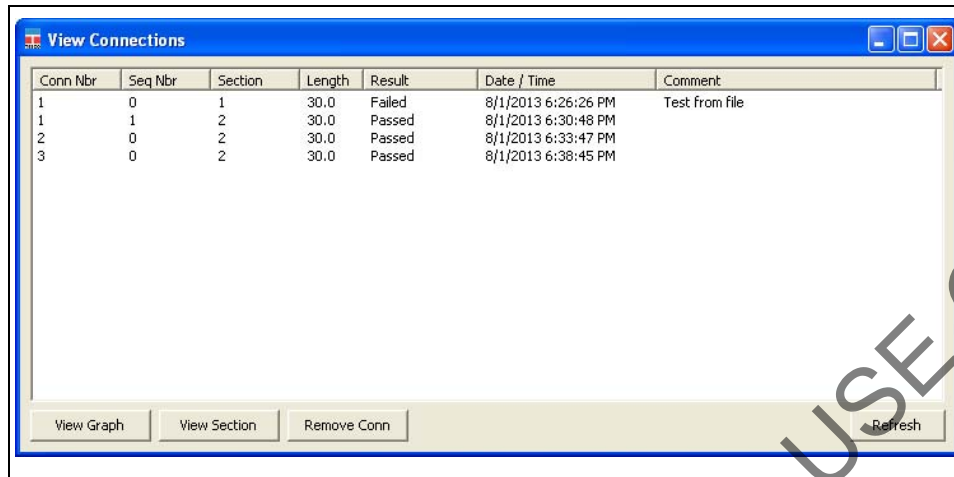


Table 2-5: View Connections Window:

Group	Item	Functionality	Description
Columns	<i>Conn Nbr</i> (Connection Number)	Displays the connection number	Running total of connections made
	<i>Seq Number</i> (Sequence Number)	Displays the sequence number	Number of attempts made on a connection
	<i>Section</i>	Displays the Section	Section number
	<i>Length</i>	Displays casing length	Length of casing used in connection
	<i>Result</i>	Display connection result	Can be a passed, failed or forced pass connection
	<i>Date/Time</i>	Displays time and date information	Displays the exact time and date of each connection attempt
	<i>Comments</i>	Displays Comments	The operator can enter comments
Button	<i>View Graph</i>	Displays the graph of the selected item.	Displays the graphed connection data from the selected connection attempt
	<i>View Section</i>	Displays job information and connection data.	Displays the job information and connection data for the selected connection attempt
	<i>Remove Conn</i> (remove connection)	Removes the last connection attempt	Removes the last connection attempt from a job

## Add New Section

The *Add New Section* window enables the operator to make revisions to the job details and connection data. A new section is created each time a change is made to the job details and connection data following a connection attempt.

However, changes can be made to the job details and connection data without creating a new section if a connection has not yet been attempted.

**Figure 2-7: Add New Section Window**

**Table 2-6: Add New Section Window:**

Group	Item	Functionality	Description
Job Details	<i>Client Company</i>	Text box	Displays the name of the company typed in the <i>New Job</i> tab
	<i>Location</i>	Text box	Displays the name of the location typed in the <i>New Job</i> tab.
	<i>Customer Representative</i>	Text box	Representative from the customer
	<i>Tesco Technician</i>	Text box	TESCO technician entering the job and connection data
	<i>Thread Representative</i>	Text box	Independent thread expert



**Table 2-6: Add New Section Window:**

Group	Item	Functionality	Description
Casing	<i>Manufacturer</i>	Text box	Casing manufacturer
	<i>Name</i>	Text box	Representative from casing manufacturer
	<i>Type</i>	Text box	Type of casing
	<i>Grade</i>	Text box	Steel grade of casing
	<i>Diameter cm</i>	Text box	Casing diameter value. A correct casing diameter value is vital for accurate calculation of RPM. A metric or diameter vale can be entered pending on the units of measure selection made in the <i>Select Job</i> tab.  For information on selecting how units are displayed, see Table 2-1 on page 7.
	<i>Weight kg/cm</i>	Text box	Casing weight value. A metric or diameter vale can be entered pending on the units of measure selection made in the <i>Select Job</i> tab.  For information on selecting how units are displayed, see Table 2-1 on page 7.
Shoulder	Test runs are required to determine the number of turns and the shoulder torque value. Use the Stream Check function. For more information.		
	<i>Max Torque</i>	Text box	Maximum post-shoulder target range
	<i>Min Torque</i>	Text box	Minimum post-shoulder target range
	<i>Post Shldr Turns</i>	Text box	The amount the casing should turn after 'shouldering' occurs; this value is typically very low.
	<i>+/- Delta</i>	Text box	Allowable variance for the post-shoulder turn.
	<i>Avg Start Turns</i>	Text box	Sets the turn count that pre-shoulder averaging begins at
	<i>Avg End Turns</i>	Text box	Sets the turn count that pre-shoulder averaging ends at
	<i>Avg Offset ft-lb</i>	Text box	Sets the shoulder torque value above the pre-shoulder average
	<i>Auto-Shoulder Mode</i>	Check box	When the auto-shoulder mode is selected the shoulder point can be moved (manually)
Peak Torque Target	Consult your casing manufacturer for the information used in this parameter group.		
	<i>Max Torque ft-lb</i>	Text box	Maximum allowable torque value. A torque value above this setting results in a failed connection result.
	<i>Opt Torque ft-lb</i>	Text box	Optimal torque value
	<i>Min Torque ft-lb</i>	Text box	Minimum allowable torque value. A Torque value below this setting results in a failed connection result.
	<i>Turns</i>	Text box	Number of turns required to reach peak torque

**Table 2-6: Add New Section Window:**

Group	Item	Functionality	Description
	<i>+/- Delta</i>	Text box	Allowable variance in number of turns required to reach peak torque
	<i>Hold (sec)</i>	Text box	Time required to maintain the optimal torque setting. During this time, variances outside the optimal torque range result in a failed connection result.
	<i>Overshoot ft-lb</i>	Text box	Increased torque value generated by the momentum of the top drive when the casing connection is fully tightened

### Edit Current Selection

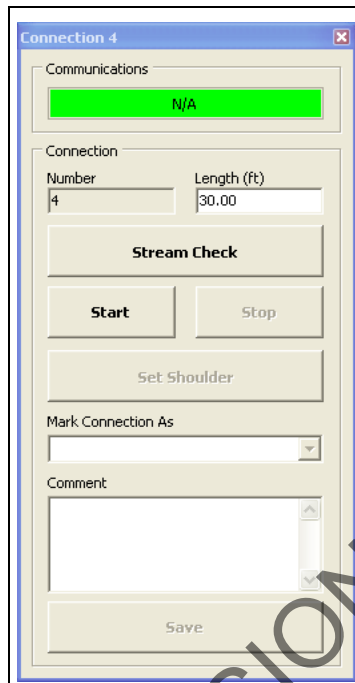
Enables the operator to makes changes to a current section's job information and connection data if no connection attempt has yet been made within that section. If a connection attempt has been made, the button is not functional.

### Connection

The *Connection* dialog box enables the operator to begin monitoring a connection attempt. Once a connection attempt is complete, the *Connection* dialog box displays the connection result pass or fail. The operator can accept the connection result or assigned a *Forced Pass* designation to a connection attempt that failed.

The *Connection* dialog box also enables the operator to start a streaming checking and monitor connection data without logging the data. The operator can also add comments associated with each connection attempt and edit casing length data.

**Figure 2-8: Connection Window**



**Table 2-7: Connection Window Dialog**

Group	Field/Element Name	Data/Notes
Communications	Status Bar	Provides information on the connection status between the TesTORK and TesTORK Manager software. The following connection status messages can be displayed: <ul style="list-style-type: none"> <li>• <i>Hunting</i> - No connection between the TesTORK and TesTORK Manager software</li> <li>• <i>Idle</i> - Connection is established between the TesTORK and TesTORK Manager software</li> <li>• <i>Streaming</i> - TesTORK Manager software is receiving connection data from the TesTORK</li> </ul>

**Table 2-7: Connection Window Dialog (Continued)**

Group	Field/Element Name	Data/Notes
Connection	Number	Increments with every passed or forced pass connection. Remains the same for a failed connection attempt.
	Length (ft)	Length of current casing (not including thread)
	Stream Check	Displays connection data without logging the data.
	Start	Starts logging a connection attempt. Once the casing has completed two turns, logging cannot be aborted and the result is recorded.
	Stop	Stops logging the connection attempt once complete and returns connection status to <i>Idle</i> status.
	Set Shoulder	Enables the operator to manually set a shoulder point. If TesTORK Manager software doesn't automatically detect a shoulder, this button is set by default.
	Mark Connection As	Enables the operator to record a connection attempt as a <i>Pass</i> , <i>Failed</i> or <i>Forced Passed</i> . A comment must be added if a connection result is over ridden or the connection attempt failed.
	Comment	Enables the operator to add a comment to any connection attempt. However, comments must be added to a <i>Failed</i> or <i>Forced Passed</i> . attempt.

## Drilling

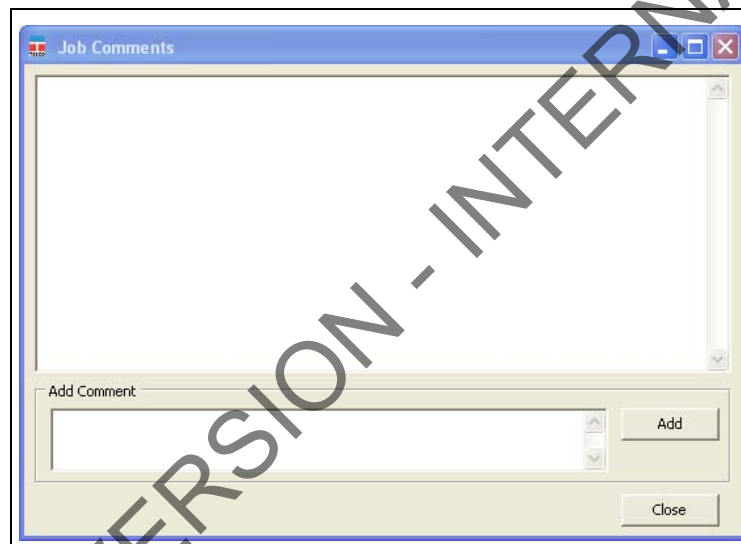
The Drilling Control dialog box enables the operator to view torque and turns data without the data being logged. Data is updated every second rather than at 100 times a second.

**Figure 2-9: Drilling Control Window**

**Table 2-8: Drilling Control Window Dialog**

Group	Field/Element Name	Data/Notes
Communications	Status Bar	Provides information on the connection status between the TesTORK and TesTORK Manager software. The following connection status messages can be displayed: <ul style="list-style-type: none"> <li>• <i>Hunting</i> - No connection between the TesTORK and TesTORK Manager software</li> <li>• <i>Idle</i> - Connection is established between the TesTORK and TesTORK Manager software</li> <li>• <i>Streaming</i> - TesTORK Manager software is relieving connection data from the TesTORK</li> </ul>
Control	Start Drilling	Starts displaying torque and turns data
	Stop Drilling	Returns TesTORK Manager software to <i>Idle</i> mode
	Elapsed Time	Time since the <i>Start</i> button was pressed

**Figure 2-10: Job Comments Window**



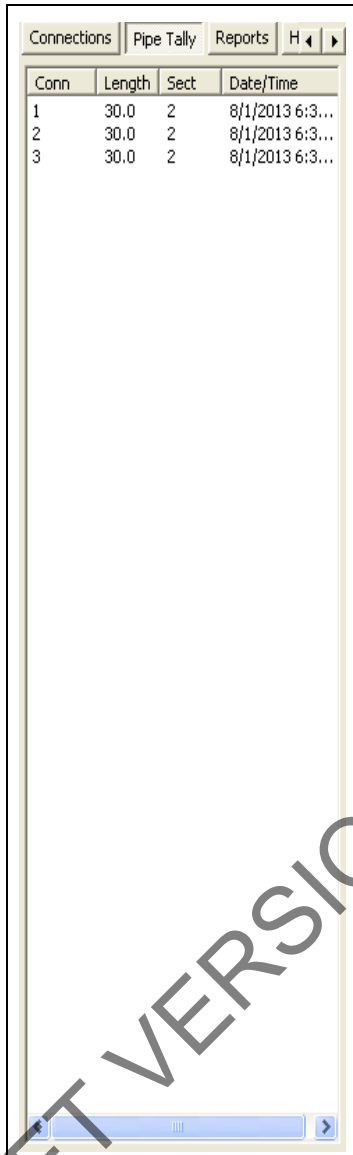
**Table 2-9: Job Comments Dialog**

Group	Field/Element Name	Data/Notes
	Add Comment	Enables the operator to add comments about a job

## Pipe Tally Side Panel

The *Pipe Tally* side panel displays a list of all connection attempts. When a connection attempt is selected the connection data associated with the attempt is displayed:

**Figure 2-11: Pipe Tally Window**



Conn	Length	Sect	Date/Time
1	30.0	2	8/1/2013 6:3...
2	30.0	2	8/1/2013 6:3...
3	30.0	2	8/1/2013 6:3...

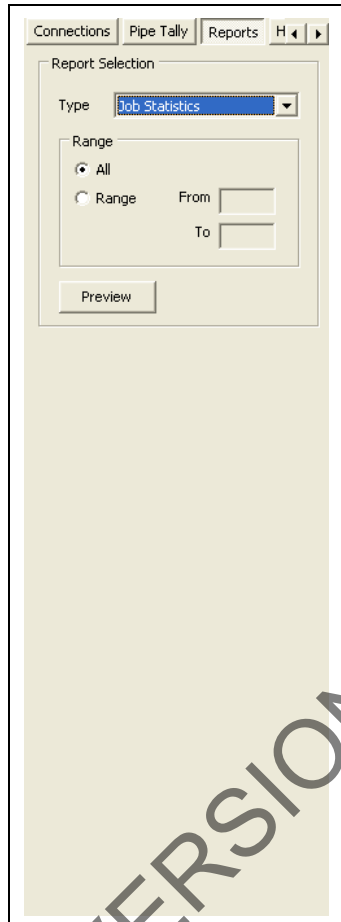
**Table 2-10: Pipe Tally Dialog**

Group	Field/Element Name	Data/Notes
Pipe Tally	Conn (Connection)	Connection number
	Length	Casing length
	Sect (Section)	Section number
	Date/Time	Time and date connection attempt was started

## Reports Side Panel

The *Reports* side panel displays the *Report Selection* window. By selecting from the drop down menu, an operator can view accumulated data from a job. Data includes job statistics, individual section details, combined section details and job comments.

**Figure 2-12: Reports Window**



**Table 2-11: Reports Window Dialog**

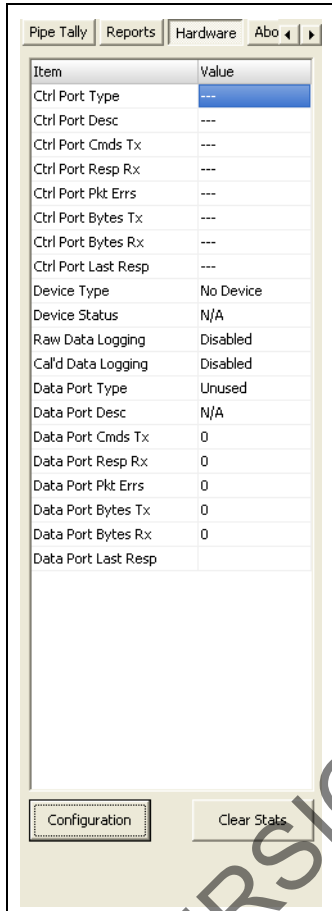
Group	Field/Element Name	Data/Notes
Report Selection	Type (Drop Down Menu)	Job Statistics Sections (detail) Sections (summary) Connections
	Range ( <i>All</i> or <i>Range</i> )	Display all items or a range of items
	Preview (Button)	Displays report

**Note:** For a complete description of each report and the information available, see “Reports” on page 46.

## Hardware Side Panel

The *Hardware* side panel displays information about the Wireless Torque Turn Tension System.

Figure 2-13: Hardware Window



Item	Value
Ctrl Port Type	---
Ctrl Port Desc	---
Ctrl Port Cmds Tx	---
Ctrl Port Resp Rx	---
Ctrl Port Pkt Errs	---
Ctrl Port Bytes Tx	---
Ctrl Port Bytes Rx	---
Ctrl Port Last Resp	---
Device Type	No Device
Device Status	N/A
Raw Data Logging	Disabled
Cal'd Data Logging	Disabled
Data Port Type	Unused
Data Port Desc	N/A
Data Port Cmds Tx	0
Data Port Resp Rx	0
Data Port Pkt Errs	0
Data Port Bytes Tx	0
Data Port Bytes Rx	0
Data Port Last Resp	



**Table 2-12: Hardware Window Dialog**

Group	Field/Element Name	Data/Notes
Item	Ctrl Port Type (Control Port Type)	System information
	Ctrl Port Desc (Control Port Description)	System information
	Ctrl Port Cnds Tx	System information
	Ctrl Port Resp Rx	System information
	Ctrl Port Pkt Errs	System information
	Ctrl Port Bytes Tx	System information
	Ctrl Port Bytes Rx	System information
	Ctrl Port Last Resp	System information
	Device Type	System information
	Device Status	System information - Status is <i>Idle</i> when communication is established between the TesTORK and TesTORK Manager software
	Raw Data Logging	System information
	Cal'd Data Logging	System information
	Data Port Type	System information
	Data Port Desc	System information
	Data Port Cnds Tx	System information
	Data Port Resp Rx	System information
	Data Port Pkt Errs	System information
	Data Port Bytes Tx	System information
	Data Port Bytes Rx	System information
	Data Port Last Resp	System information
Buttons	Configuration	Enables access to the <i>TesTork System Settings</i> dialog box. A password is required. For more information on using the <i>TesTork System Settings</i> dialog box, see "System Settings Dialog Box" on page 53.
	Clear Stats	**Please supply description

## About WTTTS side panel

The *About WTTTS* side panel displays the TESCO Wireless Torque Turn Tension System (WTTTS) Version as well as TESCO contact information.

Figure 2-14: About WTTTS Window



Table 2-13: About WTTTS Dialog Box

Group	Field/Element Name	Data/Notes
About WTTTS	Version	The Current Software Version of the TESCO WTTTS.
	Contact Information	TESCO Corporation Contact Information

## CHAPTER 3: INSTALLATION AND START UP

This chapter provides information on installing and starting The TesTORK Wireless Torque Monitoring System's hardware and software components.

The installation process consists of the following general procedures:

- Pre-installation activities

---

**Note:** Once a job has been defined, the TesTORK system components must be inspected and verified before going to the job site.

---

- Pre-job component inspection
- On-site rig-up procedures
- Installing the Torque Sub
- System start-up

### PRE-INSTALLATION ACTIVITIES

#### Verify Casing Data

Before traveling to the casing running job site, ensure the following information about the casing has been collected from the field supervisors at TESCO (see Pre-Job Information checklist 881031 in "Appendix B: TTS Checklists and Forms").

- casing weight
- casing size
- approximate lengths (tally sheet)
- connection types

#### Pre-Job Component Inspection

Complete the following steps to ensure that the TesTORK system is complete and functional before traveling to the job site.

1. Ensure that all TesTORK components are present in the pelican case(s).
2. Check all cables for wear or damaged ends. If damage is detected, or if a cable is suspect, pin out the cord and verify its condition.

3. Connect the system together and verify that data is being received at the computer and most importantly check the battery life. If battery life is not enough to complete the job, install new lithium D size batteries before going to site.

---

**Note:** See “Appendix A: Changing The Battery” for more information.

---

4. After completing the initial system verification and confirming that all the required components are present, repack all of the items into the pelican case(s) and crate.
5. Submit the completed checklist to the supervisor to confirm that there is a complete kit prepared for the upcoming job.
6. Use form 881027 as a reference; see “Appendix B: TTS Checklists and Forms”

### Pre-job system test

Ensure a pre-job system test is completed (i.e. communication can be established between the TesTORK and TesTORK Manager software) before traveling to the job site.

For example:

1. Connect all equipment.
2. Switch on computer
3. Ensure connection has been established between the TesTORK and TesTORK Manager software

## ON-SITE RIG UP PROCEDURES

Complete the following steps to ensure that the correct placement of the TesTORK system’s hardware components after arriving at the job site.




---

**Danger!** The printer (and memory stick if used) must only be used in a safe area.

---




---

**Danger!** Ensure each piece of equipment has the appropriate rating for the location for where it will be positioned.

---




---

**Caution:** The base radio must be positioned with its antenna in line of sight with the TesTORK.

---

1. Report to on-site supervisor(s) for orientation and initial introductions.
2. Go to the rig floor and determine hardware placement for the major components of the TesTORK system.
3. Place the major TesTORK system components.
4. Connect the major TesTORK system components.

## INSTALLING THE TESTORK SUB

Content or cross reference TBD

DRAFT VERSION - INTERNAL USE ONLY

## SYSTEM START UP

After the on-site rig up procedures have been completed and the TesTORK has been installed, the TesTORK system is ready to start.

Once started, the TesTORK system is ready to begin monitoring and logging connection attempts.

---

**Note:** For information on using TesTORK system to monitor and log connection attempts, see "Operation" on page 33.

---

Start the TesTORK system by completing the following procedures:

1. Turn on the TesTORK
2. Start TesTORK Manager software

### Turning the TesTORK on or off

When the TesTORK is turned on it will automatically start looking for a wireless signal from base radio. The TesTORK automatically connects to the base radio (and TesTORK Manager software) once a connections is established.

---

**Note:** The TesTORK sub is automatically powered off when it does not have a wireless connection for 15 minutes or more. Therefore, when not in use for an extended period on the rig, disconnect power to the receiver to preserve the batteries in the TesTORK.

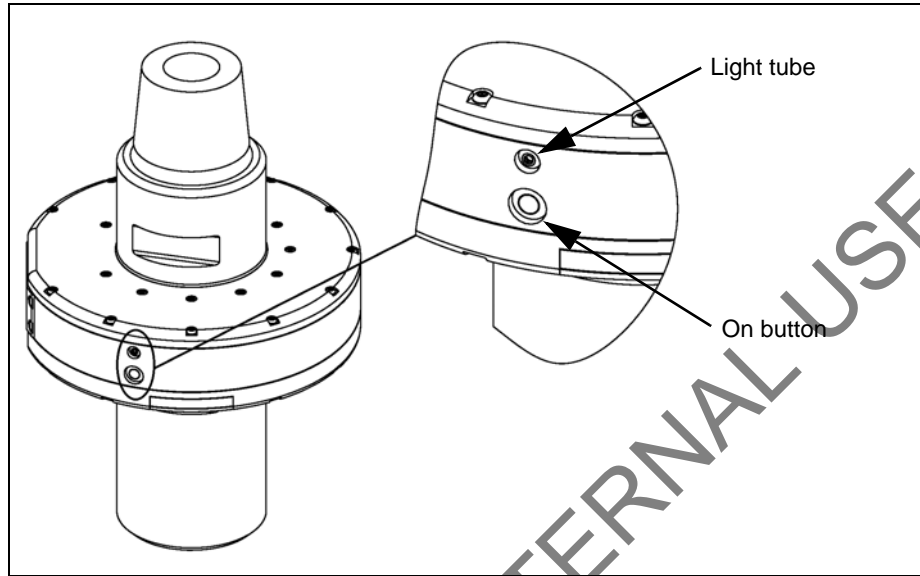
---

Use the following procedures to turn the TesTORK sub on or off:

To turn on the TesTORK sub

Push the **Power** button on the side of the TesTORK sub.

**Figure 3-1: Turning on the TesTORK**



The light tube located above the power button will flash five times

To turn off the TesTORK sub

Push the **Power** button on the side of the TesTORK sub.

The power button will flash five times.

## Starting TesTORK Manager software

Use the following procedures to start TesTORK Manager software and check that connection has been established between the TesTORK sub and TesTORK Manager software.

To start TesTORK Manager software

1. Ensure the computer hosting TesTORK Manager software is powered up and the desktop is displayed on the screen.
2. Double-click the **TesTORKManager** program icon located on the Desktop.

The *Select Job* dialog box appears.

**Note:** If this is the first time starting TesTORK Manager software on the host computer, a dialog box appears confirming that a job directory must be set before starting the software. Browse to and select (create) a suitable folder, and then click **OK**.

TesTORK Manager software uses the selected folder to store log files containing configuration and connection data from each job started in the software.

3. Select one of the following options:

If you want to:	Complete these steps:
Start an existing job	<ol style="list-style-type: none"> <li>a. Ensure the <b>Existing Jobs</b> tab is selected. The <i>Existing Jobs</i> dialog box appears.</li> <li>b. Select a job, and then click <b>OK</b>. <b>Note:</b> Use the Display Filter buttons to display the most recent jobs or all jobs. The TesTORK Manager software main screen appears.</li> </ol>



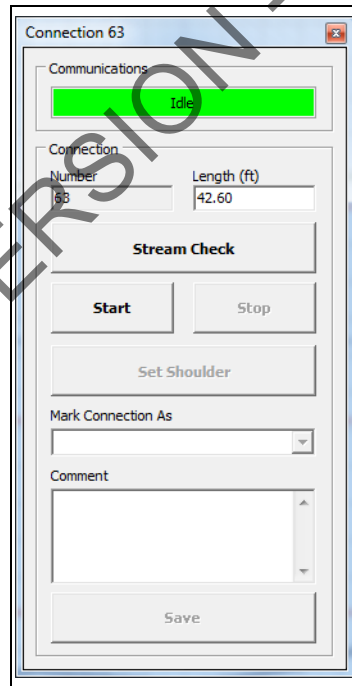
If you want to:	Complete these steps:
Create a new job	<p><b>a.</b> Click the <b>New Jobs</b> tab. The <i>New Jobs</i> dialog box appears.</p> <p><b>b.</b> Type a client name in the <i>Client</i> box.</p> <p><b>c.</b> Type a location in the <i>Location</i> box.</p> <p><b>d.</b> Select a unit of measure using the <i>Units of Measure</i> radio buttons.</p> <p><b>e.</b> Type a starting connection number in the <i>Starting Connection</i> box.</p> <p><b>f.</b> Click <b>OK</b>. The <i>Create New Job</i> Window appears</p> <p><b>g.</b> Type the relevant information or data in the text boxes. <b>Note:</b> For a description of each text box item, see Figure 2-3 on page 8.</p> <p><b>h.</b> Click <b>OK</b>. The TesTORK Manager software main screen appears.</p>

To check connection between the TesTORK sub and TesTORK Manager software

1. On the main screen, click the **Connections** button.

The *Connections* dialog box appears.

Figure 3-2: Connections dialog box



2. Check the *Communications* status box

The message *Idle* is displayed when communication between the TesTORK and - TesTORK Manager software is established.

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## CHAPTER 4: OPERATION

This chapter provides information on using the various features of TesTORK Wireless Torque Monitoring System.

Information in this chapter includes:

- Pre-job activity list
- Overview
- Connections

### PRE-JOB ACTIVITY LIST

Ensure the following activities have been completed before using the procedures in this chapter.

**Table 1: Pre-job task list**

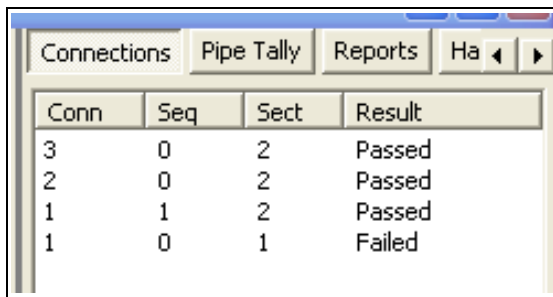
Activity	Reference
Pre-installation activities	page 25
On-site rig-up procedures	page 26
Installation of the TesTORK sub	page 27
System Start-up	page 28
Ensuring connection has been established between the TesTORK sub and TesTORK Manager software.	page 31

**Note:** For more information on checking the connectivity between the TesTORK sub and TesTORK Manager software, see "To check connection between the TesTORK sub and TesTORK Manager software" on page 31.

## OVERVIEW

The TesTORK system's different features and functionality are accessed by clicking on buttons at the top right side of the screen. As each button is clicked, the dialog box on the right side of the screen changes enabling access to the features and functionality associated with each button.

**Figure 4-1: Connections tab and Buttons**



Conn	Seq	Sect	Result
3	0	2	Passed
2	0	2	Passed
1	1	2	Passed
1	0	1	Failed

The following operational features and functionality are available by clicking the buttons at the top right side of the screen.

**Table 2: Operational features**

Button	Enables the operator to:
<i>Connections</i>	<ul style="list-style-type: none"> <li>• View information on completed connections</li> <li>• Add a new section by updating the connection configuration data</li> <li>• Log a connection attempt</li> <li>• Monitoring a drilling operation</li> <li>• Add a job comment</li> </ul>
<i>Pipe Tally</i>	View a list of connections
<i>Reports</i>	View and print reports providing information job statistics, sections, connections and job comments

# CONNECTIONS

Click the *Connections* button to access the following features:

**Table 3: Pre-job task list**

Side panel	Use this feature to:	Reference
<i>Connection</i>	<ul style="list-style-type: none"> <li>• Log a passed connection</li> <li>• Log a failed connection</li> <li>• Force past a failed connection</li> </ul>	
<i>Drilling</i>	Continually monitor torque and RPM at the at the top drive during a drilling operation	
<i>Job Comment</i>	Add a comment about the job	
<i>View All Connections</i>	<p>View information on each connection attempt for the current job.</p> <p>The following Information is available:</p> <ul style="list-style-type: none"> <li>• Graphs showing the connection attempt data</li> <li>• Configuration data used for each connection attempt</li> </ul>	
<i>New Section</i>	Begin a new section by changing the job details or connection configuration data.	
<i>Edit Current Section</i>	Edit a new section before a connection attempt has been made	

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## Connection

Use the following procedures to:

**Table 4:**

Procedure	Description
Log a passed connection	
Log a failed connection	
Force past a failed connection	<p>It is possible to force a <i>Pass</i> status on a failed connection if the operator has determined that the connection is correct, but TTeSTORk Manager software has not recognized it as such.</p> <p>One situation in which a failed connection might be forced is when the threaded coupling on the top of the casing has been removed. This can cause faults to occur. Torquing two connections at once can create a fault alarm as the shoulders might not synchronize and the applied/registered torque might be more erratic than what was set as parameters for <i>Fail</i> status. In this case, it is permitted to force a <i>Pass</i> status if the correct end result torque is achieved. The comment section allows comments regarding the reason for the pass; comments are required for all force failed or force passed connections. In addition, the option to increase the connection number to account for the double joint is available.</p> <p>Another situation where a force pass connection might occur is if the operator clicks the <i>Start</i> button after the casing has already turned a number times. This will produce a fault that indicates shouldering occurred too early and/or the optimum torque was achieved within too few turns. If it is confirmed that the connection is actually correct, then force pass the connection.</p>

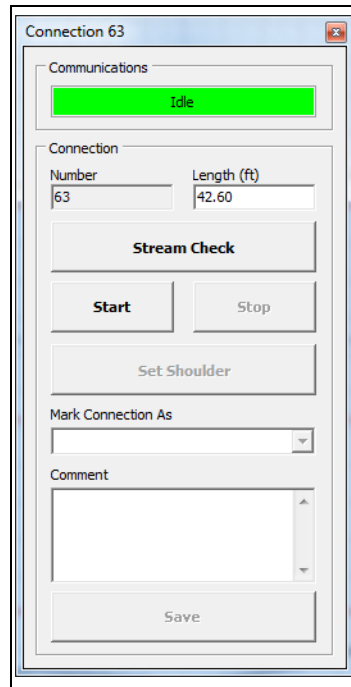
### Log a Passed Connection

Use the following procedure to accept the *Passed* status assigned to a connection by the system and continue to the next connection.

1. On the main screen, click the **Connections** button.

The *Connections* dialog box appears.

**Figure 4-2: Connections dialog box**




---

**Note:** Change the casing length if required.

---



---

**Note:** The connection number is automatically assigned the next number in the sequence.

---



---

**Note:** Click **Stream Check** to display connection data without logging a connection attempt or determining a shoulder point.

To close the *Connections* dialog box after performing a stream check, click **Stream Check**.

---

**2. Click Start.**

TesTORK Manager software is now ready to begin logging and displaying connection data.

---

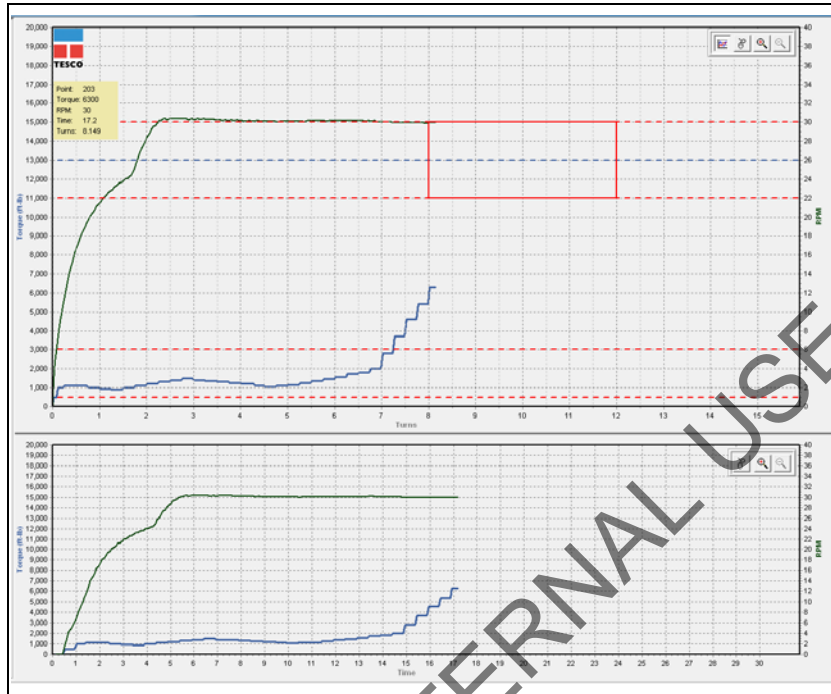
**Note:** No data is displayed until the top drive operator begins a connection attempt.

---

**3. Start a connection attempt.**

TesTORK Manager software begins logging and displaying connection data.

Figure 4-3: Connection data



4. When the *Torque* and *RPM* values reach zero, click **Stop**.

Figure 4-4: Torque and RPM values



5. Type comments in the *Comment* text box, if required.
6. Click **Save**.

The connection number and length are added to the running totals and the connection data is logged.

### Log a Failed Connection

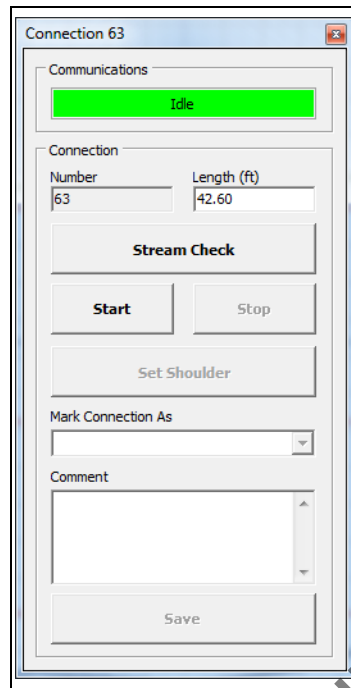
Use the following procedure to accept the *Failed* status assigned to a connection by the system and continue to the next connection.



1. On the main screen, click the **Connections** button.

The *Connections* dialog box appears.

**Figure 4-5: Connections dialog box**




---

**Note:** Change the casing length if required.

---



---

**Note:** The connection number is automatically assigned the next number in the sequence.

---



---

**Note:** Click **Stream Check** to display connection data without logging a connection attempt or determining a shoulder point.

To close the *Connections* dialog box after performing a stream check, click **Stream Check**.

---

2. Click **Start**.

TesTORK Manager software is now ready to begin logging and displaying connection data.

---

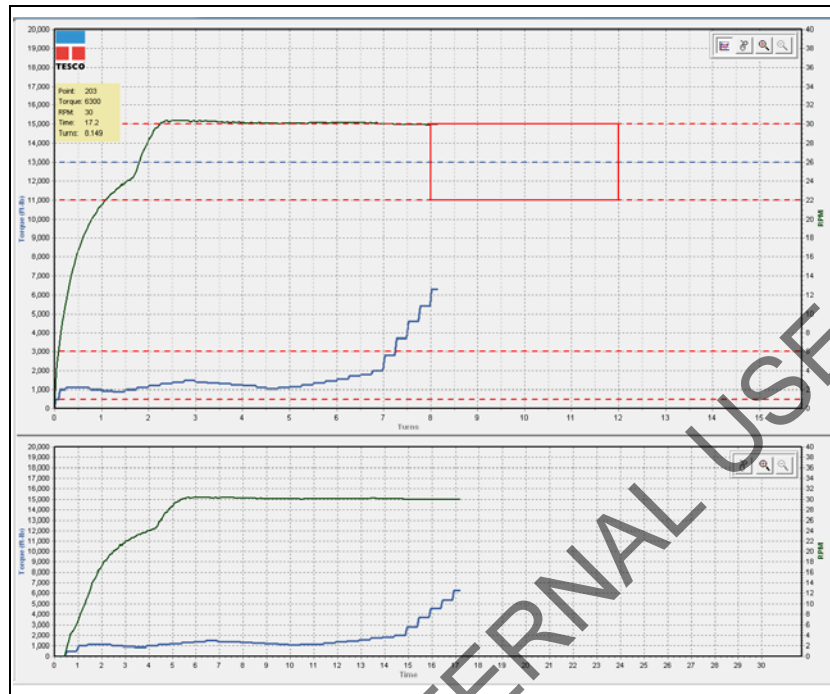
**Note:** No data is displayed until the top drive operator begins a connection attempt.

---

3. Start a connection attempt.

TesTORK Manager software begins logging and displaying connection data.

Figure 4-6: Connection data



4. When the *Torque* and *RPM* values reach zero, click **Stop**.

Figure 4-7: Torque and RPM



*Failed* is displayed in the *Mark Connection* drop-down list.

5. Type comments in the *Comment* text box.

**Note:** A comment must be typed in the *Comment* text box before clicking **Save**.

6. Click **Save**.

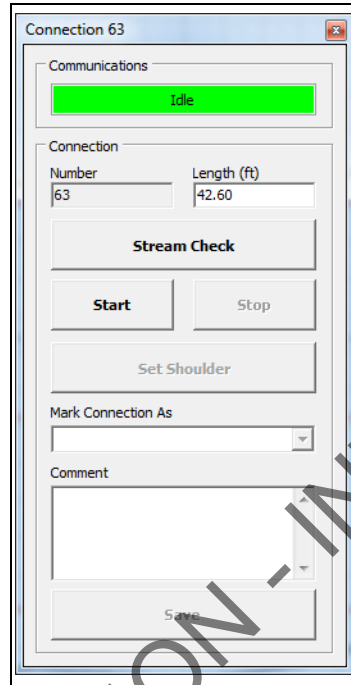
The connection number and length are added to the running totals and the connection data is logged.

## Force Past a Failed Connection

Use the following procedure to assign a *Force Past* result to a connection attempt assigned *Failed* status by the system, and continue to the next connection.

1. On the main screen, click the **Connections** button.  
The *Connections* dialog box appears.

**Figure 4-8: Connections dialog box**




---

**Note:** Change the casing length if required.

---



---

**Note:** The connection number is automatically assigned the next number in the sequence.

---



---

**Note:** Click **Stream Check** to display connection data without logging a connection attempt or determining a shoulder point.

To close the *Connections* dialog box after performing a stream check, click **Stream Check**.

---

2. Click **Start**.

TesTORK Manager software is now ready to begin logging and displaying connection data.

---

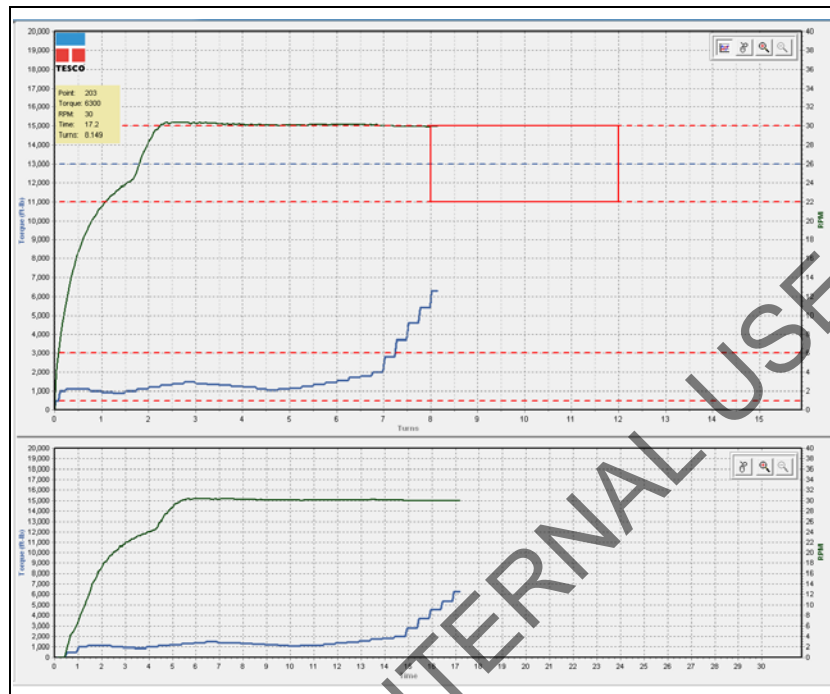
**Note:** No data is displayed until the top drive operator begins a connection attempt.

---

3. Start a connection attempt.

TesTORK Manager software begins logging and displaying connection data.

Figure 4-9: Connection data



4. When the *Torque* and *RPM* values reach zero, click **Stop**.

Figure 4-10: Torque and RPM



*Failed* is displayed in the *Mark Connection* drop-down list.

5. Select *Forced Pass* from the *Mark Connection* drop-down list.
6. Type comments in the *Comment* text box.

**Note:** A comment must be typed in the *Comment* text box before clicking **Save**.

7. Click **Save**.

The connection number and length are added to the running totals and the connection data is logged.

## MANUAL SHOULDER OPERATION

TesTORK Manager software enables the operator to *manually* change the shoulder point to any desired point. The program then recalculates the delta turn and delta torque from the new shoulder point values.

When a new job folder is created, the shoulder detection method automatically defaults to Auto Mode. In Auto Mode, everything works the same as previously described. If the shoulder detection method needs to be changed to MANUAL, then the operator must go to the *Connection* dialog box and select manual shoulder.

---

**Note:** Notice the Shoulder Target values have been disabled and the **Shoulder Target Mode** has been changed to **Manual Shoulder**. The Main Screen also indicates that Manual Shoulder mode has been selected.

---

---

**Note:** Selecting **Manual Shoulder** disables alarms associated with automatic shouldering.

---

To manually set the shoulder point

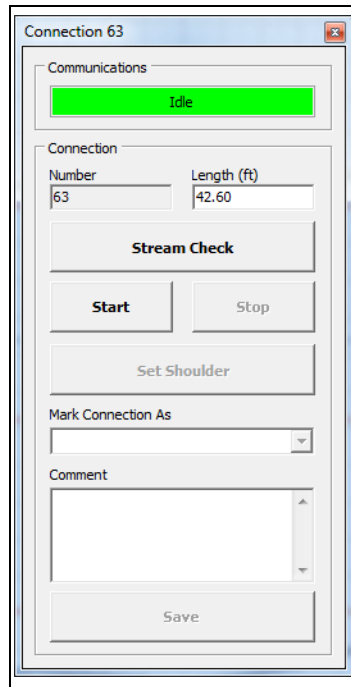
\*\*Needs finishing

Use the following procedure to manually set the shoulder point.

1. On the main screen, click the **Connections** button.

The *Connections* dialog box appears.

**Figure 4-11: Connections dialog box**




---

**Note:** Change the casing length if required.

---



---

**Note:** The connection number is automatically assigned the next number in the sequence.

---



---

**Note:** Click **Stream Check** to display connection data without logging a connection attempt or determining a shoulder point.

To close the *Connections* dialog box after performing a stream check, click **Stream Check**.

---

2. Click **Start**.

TesTORK Manager software is now ready to begin logging and displaying connection data.

---

**Note:** No data is displayed until the top drive operator begins a connection attempt.

---

3. Start a connection attempt.

## PIPE TALLY

Clicking the *Connections* button enables access to the following features:

- *View All Connections*
- *New Section*
- *Edit Current Section*

*Control* buttons. Use these buttons to log connection attempts and monitor and log connection attempts.

---

**Note:** For screen shots and a description of each dialog box elements, see “Pipe Tally Side Panel” on page 20.

---

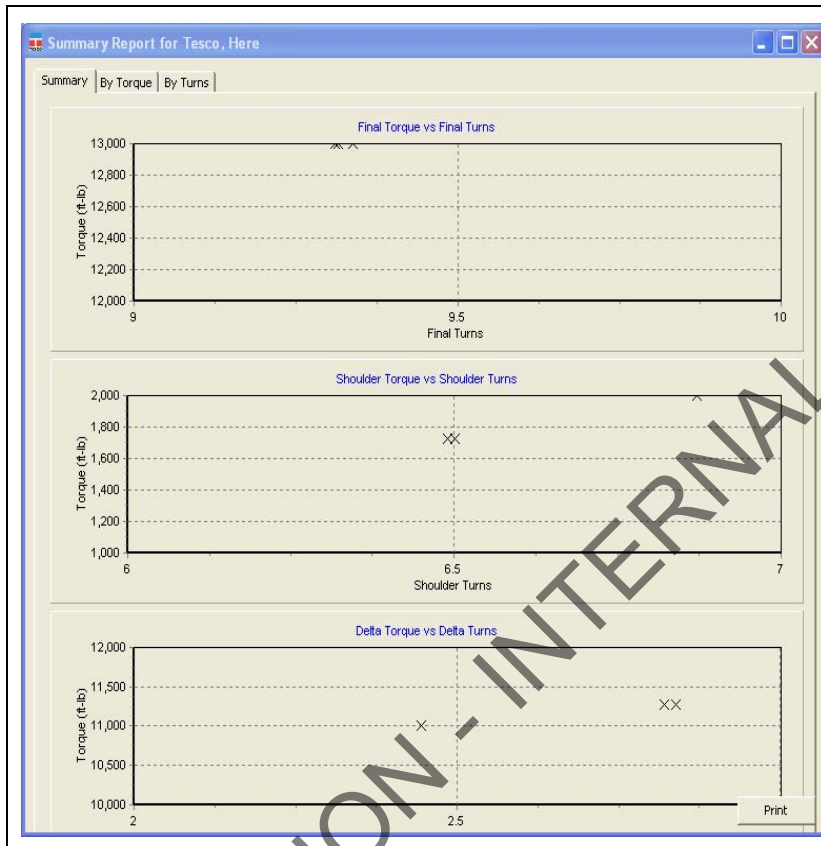
Use the *Connections* button to access the following features:

- *View All Connections*
- *New Section*

# REPORTS

The following section provide3s information on the different reports available from the Tes-TORK Manager software.

**Figure 4-12: Summary Report Window**



**Table 4-1: Summary Report Window Dialog**

Group	Field/Element Name	Data/Notes
Charts	Final Torque vs Final Turns	
	Shoulder Torque vs Shoulder Turns	
	Delta Torque vs Delta Turns	



Figure 4-13: Summary Report By Torque Window

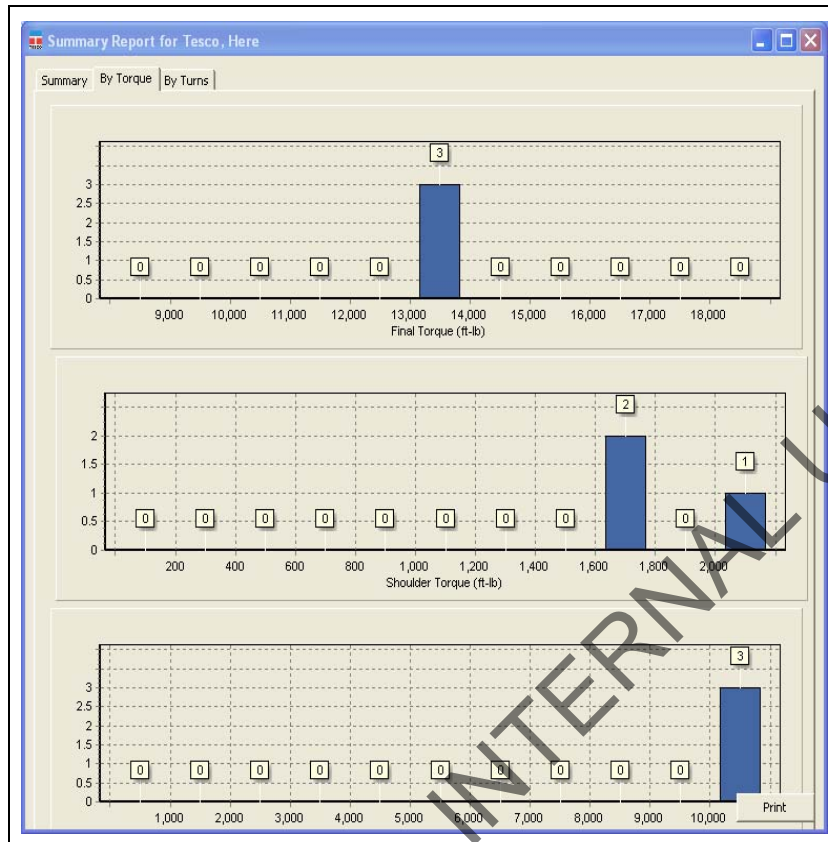


Table 4-2: Summary Report By Torque Window Dialog

Group	Field/Element Name	Data/Notes
Charts	Final Torque (ft-lb)	
	Shoulder Torque (ft-lb)	
	Delta Torque (ft-lb)	

Figure 4-14: Summary Report By Turns Window

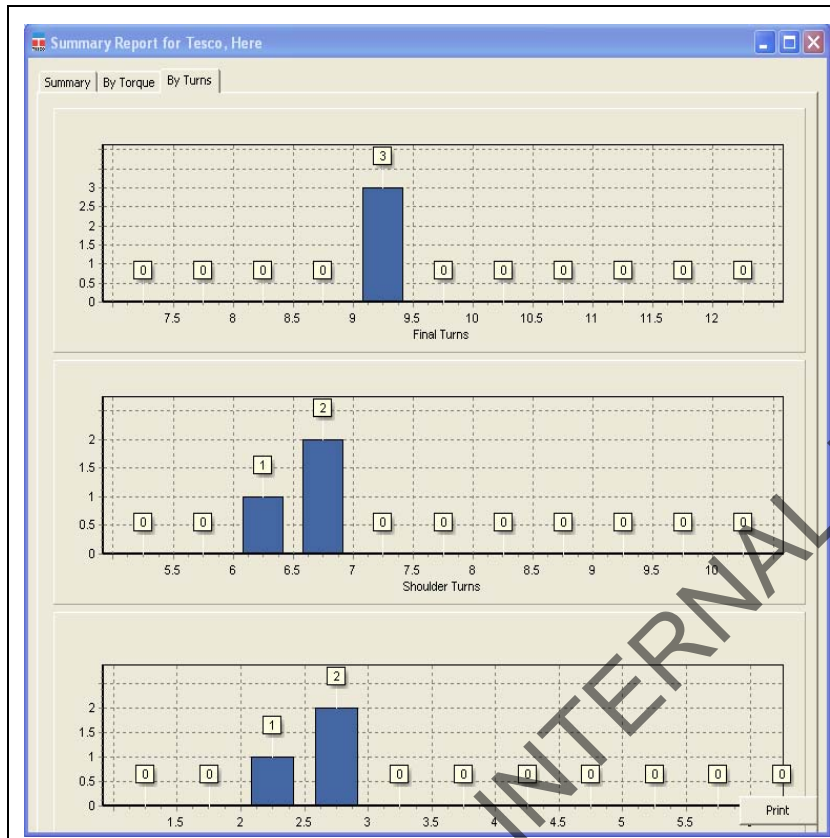


Table 4-3: Summary Window By Turns Dialog

Group	Field/Element Name	Data/Notes
Charts	Final Turns	
	Shoulder Turns	
	Delta Turns	

The TTS provides view and print report data.

**Note:** For screen shots and dialog box elements, see “Reports Side Panel” on page 21.

# CHAPTER 5: SYSTEM SETTINGS AND ADMINISTRATION

This chapter assumes that the installation, configuration, and calibration procedures for the TesTORK Wireless Torque Monitoring System have been completed.

## COMPUTER REQUIREMENTS

The following computer requirements are the minimum hardware and software requirements for the computer hosting WTTS software.

### Minimum Hardware

- Dedicated hardware platform
- 2 GB of RAM

### Supported Operating System

Windows® 7 or Windows 8 operating system

### Running WTTS Software

WTTS software is designed to be a portable program. The following options for running the software are provided.

- The operator can run WTTS software directly from a USB flash drive.

**Note:** When running WTTS software directly from a USB flash

- The operator can run TesTORK Manager software directly from the host computer's desktop.
- TesTORK Manager software can be configured to start automatically when the computer hosting the software starts.

### To run TesTORK Manager software from a USB flash drive

Use the following procedure to run TesTORK Manager software directly from a USB flash drive:

1. Insert the USB flash drive into an available USB port on the computer hosting TesTORK Manager software.

---

**Note:** If the contents of the AutoPlay dialog box doesn't appear, navigate to the USB flash drive folder containing the TesTORK Manager software executable file.

---

2. Double click the WTTS software executable file.

Alarm Toggle Bar

The *Select Job* dialog box appears.

### To run TesTORK Manager software from the host computer desktop

Use the following procedure to run TesTORK Manager software directly from the host computer's desktop:

1. Insert the USB flash drive.

---

**Note:** If the contents of the AutoPlay dialog box doesn't appear, navigate to the containing the TesTORK Manager software executable file.

---

2. Browse to and right-click the WTTS software executable file, and then click **Copy**.
3. Browse to the host computer's desktop.
4. Right-click, and then click **Paste**.

The TesTORK Manager software executable file is pasted on the host computer's desktop.

### To start TesTORK Manager software automatically when the host computer starts

Use the following procedure to configure TesTORK Manager software to start automatically when the computer hosting the software starts:

1. Insert the USB flash drive. If the contents of the AutoPlay dialog box doesn't appear, navigate to the folder containing the TesTORK Manager software executable file.
2. Browse to and right-click the TesTORK Manager software executable file, and then click **Copy**.
3. Select **Start > All Programs > Startup**
4. Right click on the *Startup* folder, and then click **Open**.

The *Startup* folder opens in Windows Explorer.

5. Right click the *Startup* folder, and then click **Paste**.

6. TesTORK Manager software will now start automatically when the computer hosting the software starts.

---

**Note:** To stop TesTORK Manager software from starting automatically, repeat steps 3-4. Then delete the WTTTS software shortcut icon from the startup folder.

---

## SYSTEM START UP

TesTORK software is a portable application that runs on a compatible computer without being installed in a way that modifies the computer's configuration information.

---

**Note:** For information the computer requirements required to run TesTORK software, see "Computer Requirements" on page 49.

---

The TesTORK software executable file can be stored and started from a host computer's desktop. TesTORK software can also be stored and started from portable storage device such as a USB drive.

A single folder is created when the TesTORK software is started for the first time. The folder provides a location for all configuration data and data logs for each job. This enables operators to start TesTORK software and resume work on an existing job without reentering any configuration data. New configuration data is entered each time a new job is started.

Use the following procedures to start TesTORK software for the first time on a host computer

To start TesTORK software for the first time on a host computer

1. Ensure the Torque Turn System TesTORK computer is powered up and the desktop is displayed on the screen.
2. Double-click the **TestTORKManager** program icon located on the Desktop.

A dialog box appears confirming that a job data directory must be set before starting the software.

3. Click **OK**.

The *Browse For Folder* dialog box appears.

---

**Note:** TesTORK software uses the selected folder to store log files containing configuration and connection data from each job started in the software.

---

4. Browse to and select (or create) a suitable folder, and then click **OK**.

The *Select Job* dialog box appears.

## 5. Select one of the following options:

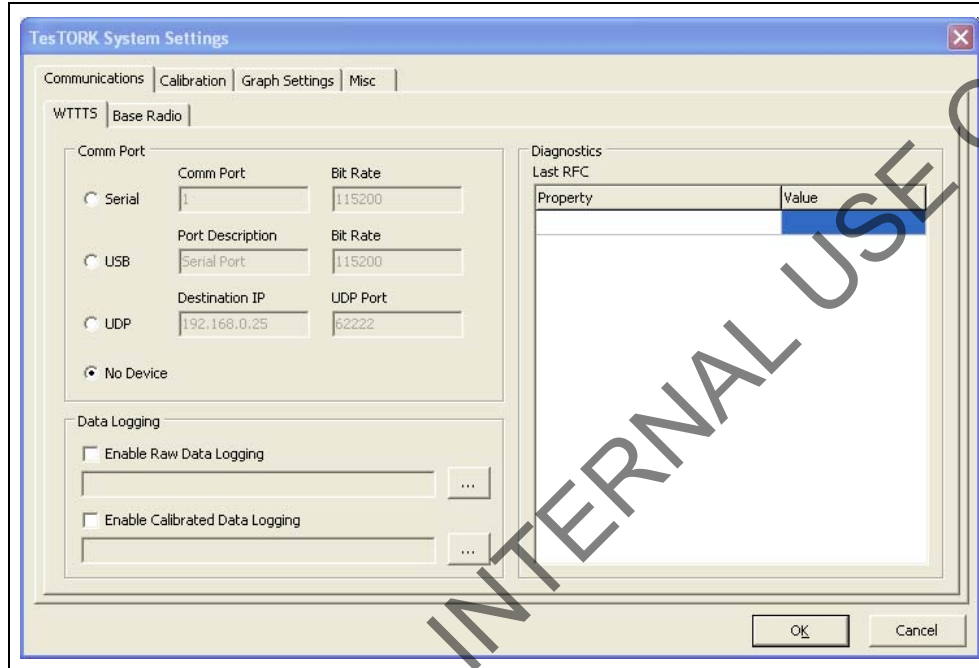
If you want to:	Complete these steps:
Start an existing job	<p><b>a.</b> Ensure the <i>Existing Jobs</i> tab is selected.</p> <p><b>b.</b> Select a job, and then click <b>OK</b>.</p> <p>Use the Display Filter buttons to display the most recent jobs or all jobs.</p> <p>The TesTORK main screen appears.</p>
Create a new job	<p><b>a.</b> Click the <b>New Jobs</b> tab.</p> <p>The <i>New Jobs</i> dialog box appears.</p> <p><b>b.</b> Type a client name in the <i>Client</i> box.</p> <p><b>c.</b> Type a location in the <i>Location</i> box.</p> <p><b>d.</b> Select a unit of measure using the <i>Units of Measure</i> radio buttons.</p> <p><b>e.</b> Type a starting connection number in the <i>Starting Connection</i> box.</p> <p><b>f.</b> Click <b>OK</b>.</p> <p>The <i>Create New Job</i> Window appears</p> <p><b>g.</b> Type the relevant information or data in the text boxes.</p> <p>For a description of each text box item, see Figure 2-3 on page 8.</p> <p><b>h.</b> Click <b>OK</b>.</p> <p>The TesTORK Manager software main screen appears.</p>

# SYSTEM SETTINGS DIALOG BOX

## Configuration

Selecting the *Configuration* button opens the *System Settings* window.

**Figure 5-1: System Settings Window -> Communications Tab Window**



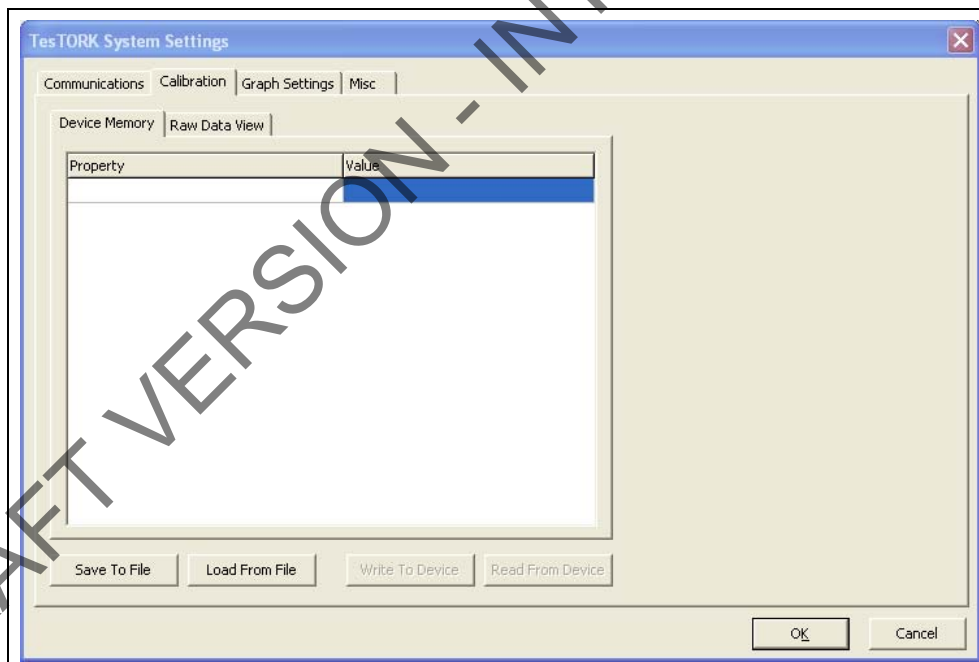
**Table 5-1: System Settings -> Communications Tab Dialog**

Group	Field/Element Name	Data/Notes
WTTTS/Base Radio	Serial (Radio Button)	Comm Port
	USB (Radio Button)	Port Description
	UDP (Radio Button)	Destination IP
	No Device (Radio Button)	There is no WTTTS Device
Data Logging	Enable Raw Data Logging (Checkbox)	If the <i>Enable Raw Data Logging</i> box is checked the user can select where to save the log file by clicking on the "...” button.
	Enable Calibrated Data Logging (Checkbox)	If the <i>Enable Calibrated Data Logging</i> is checked the user can select where to save the log file by clicking on the "...” button.

**Table 5-1: System Settings -> Communications Tab Dialog (Continued)**

Group	Field/Element Name	Data/Notes
Diagnostics	Link State	
	Last RFC	
	Temperature	
	Battery Life	
	Battery Type	
	Pressure	
	RPM	
	Last Reset	
	RF Channel	
	Current Mode	
	RFC Rate	
	RFC Timeout	
	Stream Rate	
	Stream Timeout	
Pairing Timeout		

**Figure 5-2: System Settings -> Calibration Tab -> Device Memory Tab Window**





**Table 5-2: System Settings -> Calibration -> Device Memory Dialog**

Group	Field/Element Name	Data/Notes
Device Memory	Cal Version	
	Cal Revision	
	Serial Number	
	Manufacturer Info	
	Manufacturer Date	
	Torque 000 Offset	
	Torque 000 Span	
	Torque 180 Offset	
	Torque 180 Span	
	Tension 000 Offset	
	Tension 000 Span	
	Tension 090 Offset	
	Tension 090 Span	
	Tension 180 Offset	
	Tension 180 Span	
	Tension 270 Offset	
	Tension 270 Span	
	Gyro Offset	
	Gyro Span	
	Pressure Offset	
Pressure Span		
Buttons	Save To File	Save Calibration Data to User-Specified File Location
	Load From File	Load Calibration Data from a User-Specified Location.
	Write To Device	
	Read From Device	

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Figure 5-3: System Settings -> Calibration -> Raw Data View Tab Window

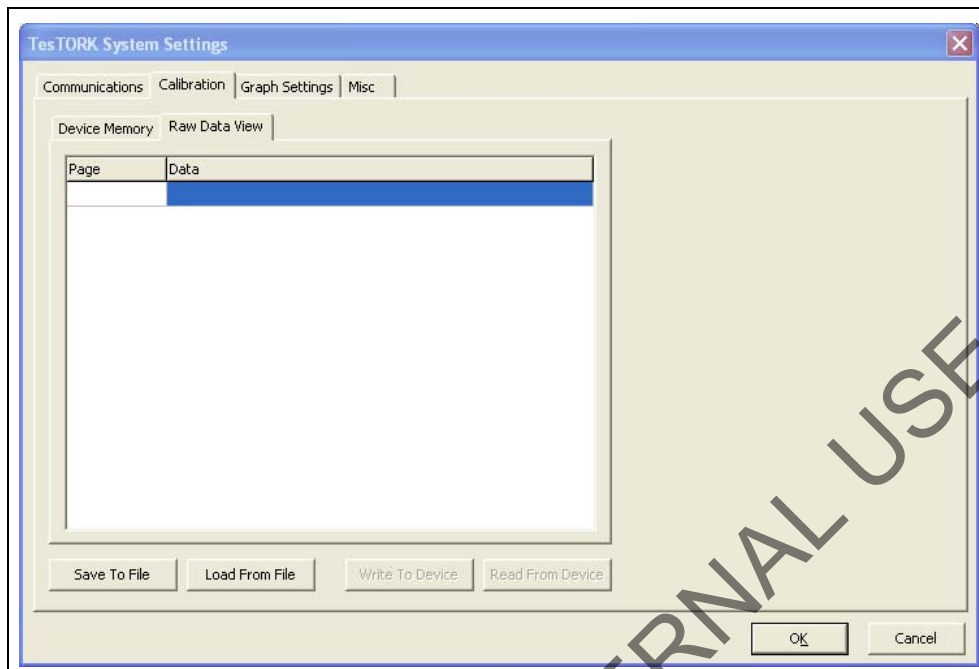


Table 5-3: System Settings -> Calibration -> Raw Data View Dialog

Group	Field/Element Name	Data/Notes
Data ViewRaw	Page	
	Data	
Buttons	Save To File	Save Calibration Data to User-Specified File Location
	Load From File	Load Calibration Data from a User-Specified File Location
	Write To Device	
	Read From Device	

Figure 5-4: System Settings -> Graph Settings Window

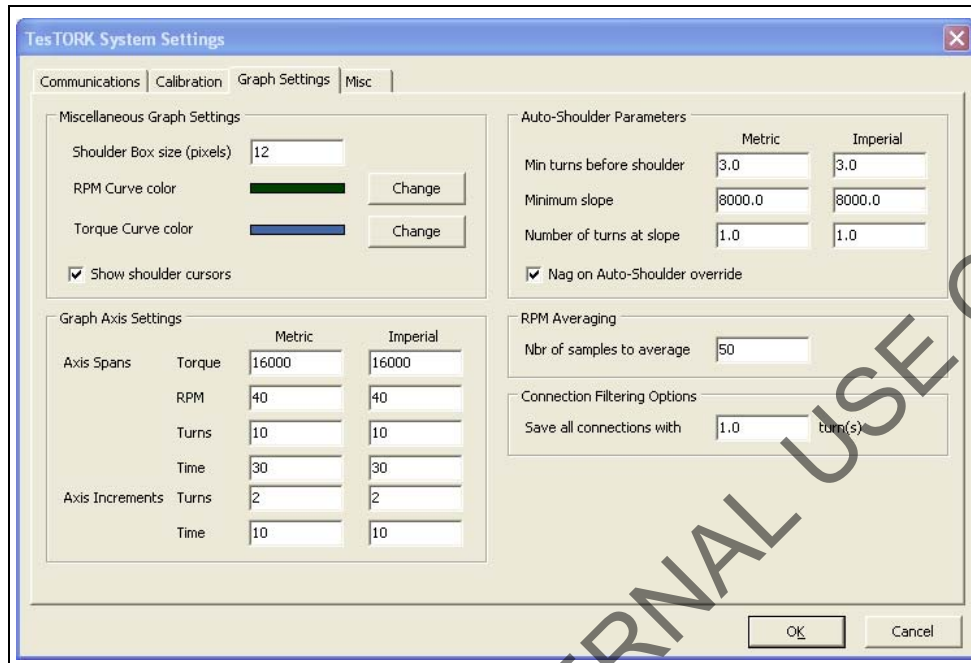


Table 5-4: System Settings -> Graph Settings Dialog

Group	Field/Element Name	Data/Notes
Miscellaneous Graph Settings	Shoulder Box size (pixels)	
	RPM Curve Color	Specify the Color of the RPM Curve Graph
	Torque Curve Color	Specify the Color of the Torque Curve Graph
	Show shoulder cursors (Checkbox)	If checked, shoulder cursors are displayed in the graph
Graph Axis Settings (Axis Spans)	Torque	
	RPM	
	Turns	
	Time	
Graph Axis Settings (Axis Increments)	Turns	
	Time	
Auto-Shoulder Parameters	Min turns before shoulder	
	Minimum slope	
	Number of turns at slope	
	Nag on Auto-Shoulder override (Checkbox)	
RPM Averaging	Nbr of samples to average	

Figure 5-5: System Settings -> Misc Window

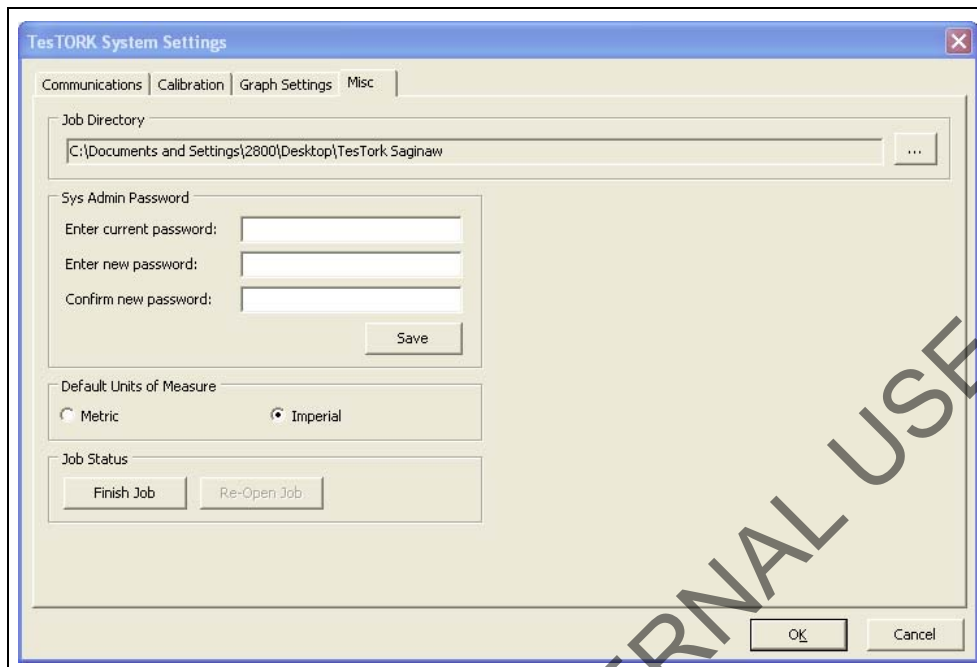


Table 5-5: System Settings -> Misc Dialog

Group	Field/Element Name	Data/Notes
Job Directory	Location of Job Directory	The user can navigate to the desired job directory by clicking the "...” button.
Sys Admin Password	Enter current password	Enter the Current Password into the Text field
	Enter new password	Enter the New Password into the Text Field
	Confirm new password	Confirm the New Password by Entering it in the Text Field
	Save (Button)	Save the New Password
Default Units of Measure	Metric/Imperial (Radio Buttons)	Select with Which Units of Measurement the WTTTS will Display
Job Status	Finish Job (Button)	
	Re-Open Job (Button)	

# CHAPTER 6: TESCO BASE RADIO

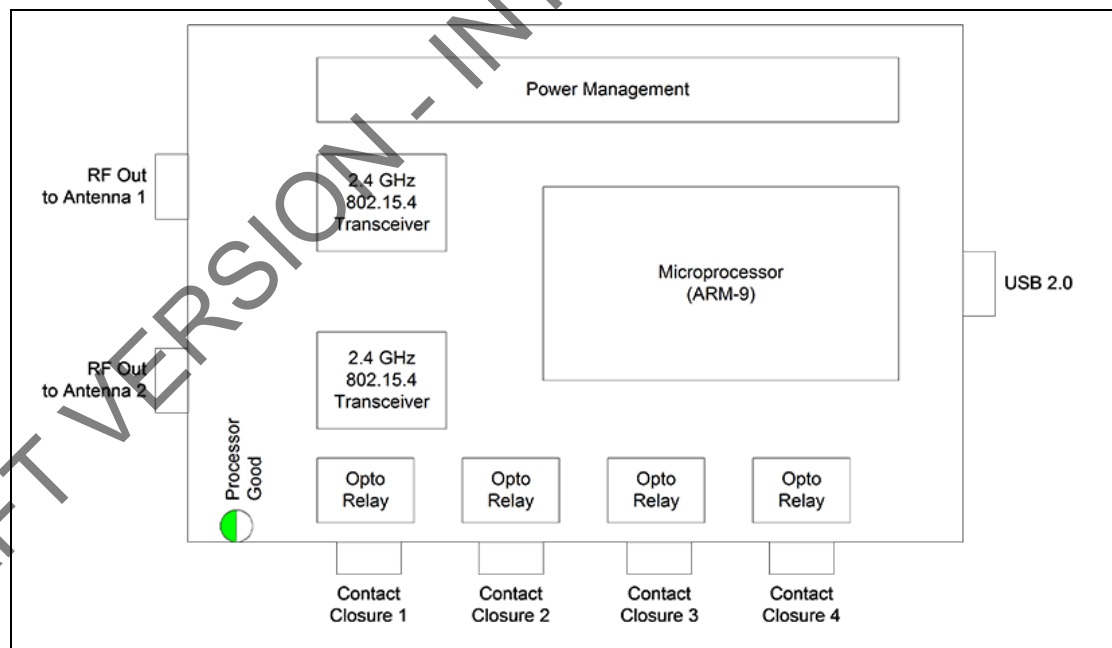
## INTRODUCTION

The TESCO Base Radio is a high performance communications system designed to provide wireless communications with a variety of TESCO products, including:

- TESCO Wireless Torque Turn System (WTTTS)
- TESCO Cement Plug Tracking System (CPTS)
- TESCO Compact Casing Drive System (CCDS)

## BLOCK DIAGRAM

Figure 6-1: TESCO Base Radio Block Diagram



## ELECTROMAGNETIC COMPATIBILITY NOTICE

### FCC

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

### IC RSS 210

*This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

### SAFETY

The TESCO Base Radio is intended to be used in locations where hazardous gases may occasionally be present. It meets the requirements of IEC-60079-11 for use in Zone 2 Group IIB; CSA 22.2 No. 213 and ANSI/ISA 12.12.01-2012 Class 1 Division 2, gas groups C and D.

**Note: Only units with either a Special Inspection sticker or Model Certification label shall be used in locations where hazardous gases may be present.**

### 4.1.1 CSA 22.2 No. 213

THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS 1, DIVISION 2, GROUPS C AND D, OR NON-HAZARDOUS LOCATIONS ONLY.



**Warning! EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.**



**Avertissement! RISQUE D'EXPLOSION - LA SUBSTITUTION DES COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE 1, DIVISION 2.**



**Warning! EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.**



**Avertissement! RISQUE D'EXPLOSION - AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX**

### 4.1.2 ANSI/ISA 12.12.01

## USER CONTROLS

The TESCO Base Radio is designed to be used as part of a TESCO Wireless System. All control of the Base Radio is through the TESCO Software.

There are no physical user controls on the TESCO Base Radio.

## SPECIFICATIONS

### Environmental

The TESCO Base Radio is designed for outdoor use.

**Table 6-1: TESCO Base Radio Environmental Specifications**

Operating Temperature Range	-40 °C to +70 °C.
Storage Temperature	-40 °C to +85 °C.
Operating and Storage Humidity	10% to 95%
Ingress Protection	IP66 (when used with recommended connectors or dust caps)

## Radio

The TESCO Base Radio contains two radio transceivers. This allows the TESCO Base Radio to receive streaming real time measurement data from the Wireless Torque Turn Tension System on one channel while at the same time monitor supervisory devices such as the TESCO Compact Casing Drive System on the other channel.

Both radio channels are under control of the same microprocessor and the software ensures that the two radio channels operate on different frequency channels and never transmit at the same time.

The following specifications apply to both radio links:

**Table 6-2: Radio Specifications**

Parameter	Specification
Protocol	Subset of IEEE 802.15.4
Modulation	GMSK, DSSS at 250 kb/s, 2 Mchip/s
FCC/IC Emission Designator	2M42G7D
Frequency Band	2.405 to 2.480 GHz (channel centers)
Standard Channels	Channel 11 (2.405 GHz center) Channel 15 (2.425 GHz center) Channel 20 (2.450 GHz center) Channel 25 (2.475 GHz center)
Channel Bandwidth	3 MHz max. (TBV)
RF Transmit Power	-5 dBm max.
Connector	WTTTS: N-Type General Purpose: RP-TNC
Allowable Antenna Gain	+5 dBi max.

## Contact Closures

The TESCO Base Radio provides up to four opto-isolated solid-state contact closures that may be used for a variety of control alerting purposes. The state of these closures is set through the main application software.

**Table 6-3: Contact Closure Specifications**

Parameter	Specification
Configuration	Form A (Normally Open)
Load Current	100 mA max.
Off-State Voltage	350 V Peak (AC or DC)
On-State Resistance	35 ohms max, (t < 1 s); 50 ohms max, (continuous)
Isolation Voltage	1500 Vrms min.
Turn-On Time	1 ms max.
Turn-Off Time	1 ms max.



**Table 6-3: Contact Closure Specifications (Continued)**

Parameter	Specification
Connector	<i>Amphenol</i> USBBF TV 2 1 G 13-13

## Power

Power to the TESCO Base Radio is provided by the host computer through the USB connector.

**Table 6-4: Base Radio Power Specifications**

Parameter	Specification
Input Voltage Range	4.5 - 5.5 Vdc
Current	200 mA max.

## Digital Interface

The interface to the computer is by means of a single USB connector.

**Table 6-5: Digital Interface Specifications**

Parameter	Specification
Connector Type	USB Type-B
Interface Standard	USB 2.0, Serial Port Protocol

## MOUNTING

The TESCO Base Radio may be mounted to the back of the *Labresav* computer by means of the Mounting Adapter, TESCO part number 5036743.

Alternatively, it may be mounted in any convenient location within reach of the computer.

**Note: If mounted in a location exposed to weather, ensure that all unused connectors have dust-caps installed and properly fitted.**

When both radio channels are used, to minimize the risk of generating emissions that could interfere with other radio systems, ensure the two antennas are spaced at least 8" (20 cm) apart.

In order to comply with the requirements for exposure to radio frequency energy, all antennas must be mounted at least 8" (20 cm) from all persons.

## OPERATING INSTRUCTIONS

The TESCO Base Radio is intended to be used only as part of a TESCO Wireless System. To operate the TESCO Base Radio, connect it by means of a USB cable to a computer running the TESCO Wireless System software.

## MAINTENANCE

The TESCO Base Radio contains no user serviceable parts.

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# APPENDIX A: CHANGING THE BATTERY

## CAUTIONS AND WARNINGS



**Warning!** This equipment contains intrinsically safe circuitry. Substitution of components may impair intrinsic safety.

To reduce the risk of ignition of a flammable or explosive atmosphere when servicing the battery be sure the battery seals are seated properly and sealing surfaces are clean.

- The battery is rechargeable
- The battery is Class 1 Div 1 certified
- The battery terminals are the same left to right. The battery can be inserted upside down provided the terminals are facing inwards.

## TORQUE SUB BATTERY CHANGING

1. Turn the sub so the battery compartment is easily accessible.
2. Using a 5/16" hex key, open all 4 captive screws.
3. Remove the plate.
4. Pull out the existing battery.
5. Push in the new battery.
6. Replace the battery compartment into the top sub with 4 captive screws.

**Note:** The TesTORK system will automatically power up when the battery is fitted in the battery compartment.

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## APPENDIX B: TTS CHECKLISTS AND FORMS

The following forms are available for the Torque Turn System. See the following pages for examples of each form.

The following forms are available in full-size on the laptop or can be downloaded from TescoLink.

- Form #881020 - Job Safety Analysis Sheet
- Form #881049 - Wireless TTS Pre-Job Information Sheet
- Form #881032 - TTS Required Data Sheet
- Form #881028 - TTS Tool Kit Inventory List
- Form #881050 - Wireless TTS Inventory List
- Form #881042 - Final Checklist

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# JOB SAFETY ANALYSIS WORKSHEET

## Form Description

The Job Safety Analysis Sheet is an internal document for all TESCO workers including field, shop, and office employees.

This document is to be filled out by the supervisor at the beginning of each job.

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# TORQUE TURN SYSTEM: PRE-JOB INFORMATION CHECKLIST

## Form Description

The pre-job information checklist is a collection of rig information.

The pre-job information checklist is partially filled out by the TESCO Service Manager then sent to the field office to collect the remaining information. The information on this checklist is used by the job supervisor responsible for the torque turn job in the field.

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	<h2 style="margin: 0;">Wireless Torque Turn System Pre-Job Information Checklist</h2>
---	---

<b>Operator:</b>	
Office Contact:	
Phone Number:	Fax Number:
Email:	
<b>Operator Field Representative:</b>	
Office Contact:	
Phone Number:	Fax Number:
Email:	
<b>Drilling Contractor:</b>	
Office Contact:	
Phone Number:	Fax Number:
Email:	
<b>Rig Manager:</b>	
Office Contact:	
Phone Number:	Fax Number:
Email:	
Legal land description and well name where rig is located:	
Directions to the rig:	
Information on the last run of casing string:	
Depth: <input type="checkbox"/> ft <input type="checkbox"/> m	Size: <input type="checkbox"/> in <input type="checkbox"/> mm
Current well status:	
Anticipated timing of casing job:	
Job description/special instructions:	
Depth: <input type="checkbox"/> ft <input type="checkbox"/> m	Length of string: <input type="checkbox"/> ft <input type="checkbox"/> m
Casing Manufacturer:	Size: <input type="checkbox"/> in <input type="checkbox"/> mm
Weight: <input type="checkbox"/> lb/ft <input type="checkbox"/> kg/m	Grade:
Special/Drift (ID): <input type="checkbox"/> in <input type="checkbox"/> mm	Thread Type:
Make-up torque:	
Minimum:	Optimum:
Maximum:	<input type="checkbox"/> ft-lbs <input type="checkbox"/> N-m



## Wireless Torque Turn System Pre-Job Information Checklist

### Top Drive in use:

TESCO:  EMI  ECI  HCI  HS  HC  HMI

Details:

VARCO: Model: Grabber Model:

CANRIG: Model: Grabber Model:

NATIONAL: Model: Grabber Model:

OTHER: Model: Grabber Model:

RPM Sensor Assembly installed on the CDS that was identified for this job  Yes  No

### Redundancy Concerns

Spare laptop:  Yes  No Spare Laptop Battery:  Yes  No

Spare RPM Sensor Assembly:  Yes  No Spare Cables:  Yes  No

Receiver Box  Yes  No Transmitter Box  Yes  No

Wireless Torque Sub  Yes  No

Equipment and accessories required as per the job quote:

Torque monitoring:

Other:

### Complete the information below before sending to rig:

Completed by Signature:

Fax this completed survey to the attention of:

Fax Number: Phone Number:

## TORQUE TURN SYSTEM: REQUIRED DATA SHEET

### Form Description

The required data sheet is used for information collection and is to be filled out by TESCO personnel after information has been received from the rig on the Pre-Job Information Checklist (form # 881031).

If some information is not received from the rig, the TESCO job supervisor will be required to supply the remaining information while on site. A rig survey is required.

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## Torque Turn System Required Data Sheet

The following casing information is required to set the parameters for the Torque/Turn or Torque/Time monitors. Tesco will ONLY use operator supplied data. Rig Survey checklist must be completed by a Tesco Representative.

		Rig Survey Required
Oil Company:	Well Name:	<input type="checkbox"/>
Drilling Supervisor:	L.S.D.:	<input type="checkbox"/>
Drilling Engineer:	Contractor:	<input type="checkbox"/>
Wellsite Supervisor:	Rig Number:	<input type="checkbox"/>
Wellsite Phone Number:	Top Drive Make:	<input type="checkbox"/>
	Top Drive Model:	<input type="checkbox"/>
Projected Casing Depth:		<input type="checkbox"/>
Project Date of Job:		
Calibration check interval: Every	joints (Tesco recommends checking a minimum of once at the mid-point.)	<input type="checkbox"/>
<b>Casing Information</b>		
Manufacturer:		<input type="checkbox"/>
Connection Name:		<input type="checkbox"/>
Casing Grade:		<input type="checkbox"/>
Casing Weight:	<input type="checkbox"/> lb/ft or <input type="checkbox"/> kg/m (Check unit of measure)	<input type="checkbox"/>
<b>Torque Target</b>		
Minimum Make Up Torque:	<input type="checkbox"/> lbf-ft or <input type="checkbox"/> N-m (Check unit of measure)	<input type="checkbox"/>
Optimum Make Up Torque:	<input type="checkbox"/> lbf-ft or <input type="checkbox"/> N-m	<input type="checkbox"/>
Maximum Make Up Torque:	<input type="checkbox"/> lbf-ft or <input type="checkbox"/> N-m	<input type="checkbox"/>
Maximum Make Up RPM:		<input type="checkbox"/>
<b>Shoulder Target</b>		
Turns to Shoulder:	Turns +/-:	<input type="checkbox"/>
Post-Shoulder Turns:	Turns +/-:	<input type="checkbox"/>
Trigger Torque:	<input type="checkbox"/> lbf-ft or <input type="checkbox"/> N-m (Check unit of measure)	<input type="checkbox"/>
Maximum Shoulder RPM:		<input type="checkbox"/>
<b>The above information was supplied and approved by the following:</b>		
Name (print):		
Position/title of approver:		
Date:		
Signature:		

## TORQUE TURN SYSTEM: TOOL KIT INVENTORY CHECKLIST

### Form Description:

The tool kit inventory checklist provides information for the job supervisor who is responsible to maintain control of all tools.

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## Torque Turn System Tool Kit Inventory Checklist

Item	Description	Part #	Qty	Origin	Item Size	Going to Site	Leaving Site
1	Battery - for Flashlight	1623	1	USA	Spring Top	<input type="checkbox"/>	<input type="checkbox"/>
2	Flashlight	2766	1			<input type="checkbox"/>	<input type="checkbox"/>
3	Bulb - for Flashlight	6054	4	Hong Kong	6 Volt	<input type="checkbox"/>	<input type="checkbox"/>
4	Duct Tape - Roll	1584	2	USA	2"	<input type="checkbox"/>	<input type="checkbox"/>
5	Stainless Steel Wire - Roll	2909	1	CHINA	0.032"	<input type="checkbox"/>	<input type="checkbox"/>
6	Tie Wrap - Plastic	5381	100	USA	¼" x 12"	<input type="checkbox"/>	<input type="checkbox"/>
7	Tie Wrap - Plastic	805	100	USA	5/16" x 30"	<input type="checkbox"/>	<input type="checkbox"/>
8	Tie Wrap - Plastic	806	50	USA	1/8" x 7"	<input type="checkbox"/>	<input type="checkbox"/>
9	Hex Key Set - Short Arm	1289	1	USA	0.028" to 5/8"	<input type="checkbox"/>	<input type="checkbox"/>
10	Hex Key Set - Short Arm - Metric	1286	1	USA	0.7 mm to 10 mm	<input type="checkbox"/>	<input type="checkbox"/>
11	Fluke Meter - Process 787	18012	1	USA		<input type="checkbox"/>	<input type="checkbox"/>
12	Fuse for Fluke Meter	0487	2	USA	11 Amp	<input type="checkbox"/>	<input type="checkbox"/>
13	Fuse for Fluke Meter	0491	2	USA	44/100 Amp	<input type="checkbox"/>	<input type="checkbox"/>
14	Alligator Clip	3794	2	USA	Red and Black	<input type="checkbox"/>	<input type="checkbox"/>
15	Solder 60/40	6465	1	CANADA	60/40	<input type="checkbox"/>	<input type="checkbox"/>
16	Solder for Pyropen	7475	1	CANADA	3/32/Silver	<input type="checkbox"/>	<input type="checkbox"/>
17	Butane for Pyropen	1650	1	USA	145 g	<input type="checkbox"/>	<input type="checkbox"/>
18	Pyropen	1524	1	USA	cordless	<input type="checkbox"/>	<input type="checkbox"/>
19	Vise Grip	1400	1	USA	10"	<input type="checkbox"/>	<input type="checkbox"/>
20	Side Cutting Pliers	1368	1	TAIWAN	7"	<input type="checkbox"/>	<input type="checkbox"/>
21	Wire Stripper	1526	1	USA		<input type="checkbox"/>	<input type="checkbox"/>
22	Unidriver	1380	1	TAIWAN	13 PC.	<input type="checkbox"/>	<input type="checkbox"/>
23	Utility Knife	1293	1	JAPAN	L2hd	<input type="checkbox"/>	<input type="checkbox"/>
24	Small Torque Wrench	5814	1	USA		<input type="checkbox"/>	<input type="checkbox"/>
25	Terminating Screw Driver	4277	1	USA	1/8"x6"	<input type="checkbox"/>	<input type="checkbox"/>
26						<input type="checkbox"/>	<input type="checkbox"/>
27						<input type="checkbox"/>	<input type="checkbox"/>

The Above information was collected by?

Going to site	Name (print):	Signature:
Leaving site	Name (print):	Signature:


## TORQUE TURN SYSTEM: INVENTORY CHECKLIST

### Form Description

The inventory list is to be filled out by the job supervisor prior to arriving and leaving the job site.

The purpose of this list is to keep track of all equipment and to assist with information needed to prepare exportation papers for the equipment.

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	<b>Wireless Torque Turn System: Inventory Checklist</b>
	Unit Number: _____

Inventory Checklist								
Item No.	Tesco Part Number	Item Description	Country of Origin	Size (in)	Qty	Weight (lbs)	Going to Site	Leaving Site
1	770128	Pelican Case #1	USA	31.5 x 23 x 18	1		<input type="checkbox"/>	<input type="checkbox"/>
2	770316	Computer, Laversab 2900	USA		1	30	<input type="checkbox"/>	<input type="checkbox"/>
3		Power Cord for Computer	USA		1	1	<input type="checkbox"/>	<input type="checkbox"/>
4	1360005	Torque Sub	USA	28 x 16 x 16	1	300	<input type="checkbox"/>	<input type="checkbox"/>
5	1360006	Receiver Box	USA	11 x 8.5 x 6.5	1	35	<input type="checkbox"/>	<input type="checkbox"/>
6	1360007	Position Transmitter Box	USA	14.5 x 4.5 x 6	1	25	<input type="checkbox"/>	<input type="checkbox"/>
7	771035	Torque Sub Carrying Bracket	USA	20 x 19" x 13"	1	30	<input type="checkbox"/>	<input type="checkbox"/>
8		19 Pin to 9 Pin RS232 Patch Cord, e/w Receiver Box	USA		1		<input type="checkbox"/>	<input type="checkbox"/>
9		USB Patch Cord, e/w Laversab Computer	USA		1		<input type="checkbox"/>	<input type="checkbox"/>
10	770032	Printer e/w Dual Voltage PSU	USA		1	4	<input type="checkbox"/>	<input type="checkbox"/>
11	730673	Printer USB Cord					<input type="checkbox"/>	<input type="checkbox"/>
12	770224	CD Writer e/w USB Cord and Dual Voltage PSU			1		<input type="checkbox"/>	<input type="checkbox"/>
13		Spare Printer Ink Cartridges (Black and Colour)			2		<input type="checkbox"/>	<input type="checkbox"/>
14		Ream of 8.5"x11" Paper	USA	28 x 16 x 16	2	10	<input type="checkbox"/>	<input type="checkbox"/>
15	489021-1	RPM Ring	USA	11 x 8.5 x 6.5	1	35	<input type="checkbox"/>	<input type="checkbox"/>



## TORQUE TURN SYSTEM: FINAL CHECKLIST

### Form Description

The final checklist is to be completed by the job supervisor before leaving the job site.

The purpose of this checklist is to ensure that the crew is equipped with all the tools needed to complete the job.

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# Torque Turn System: Final Checklist

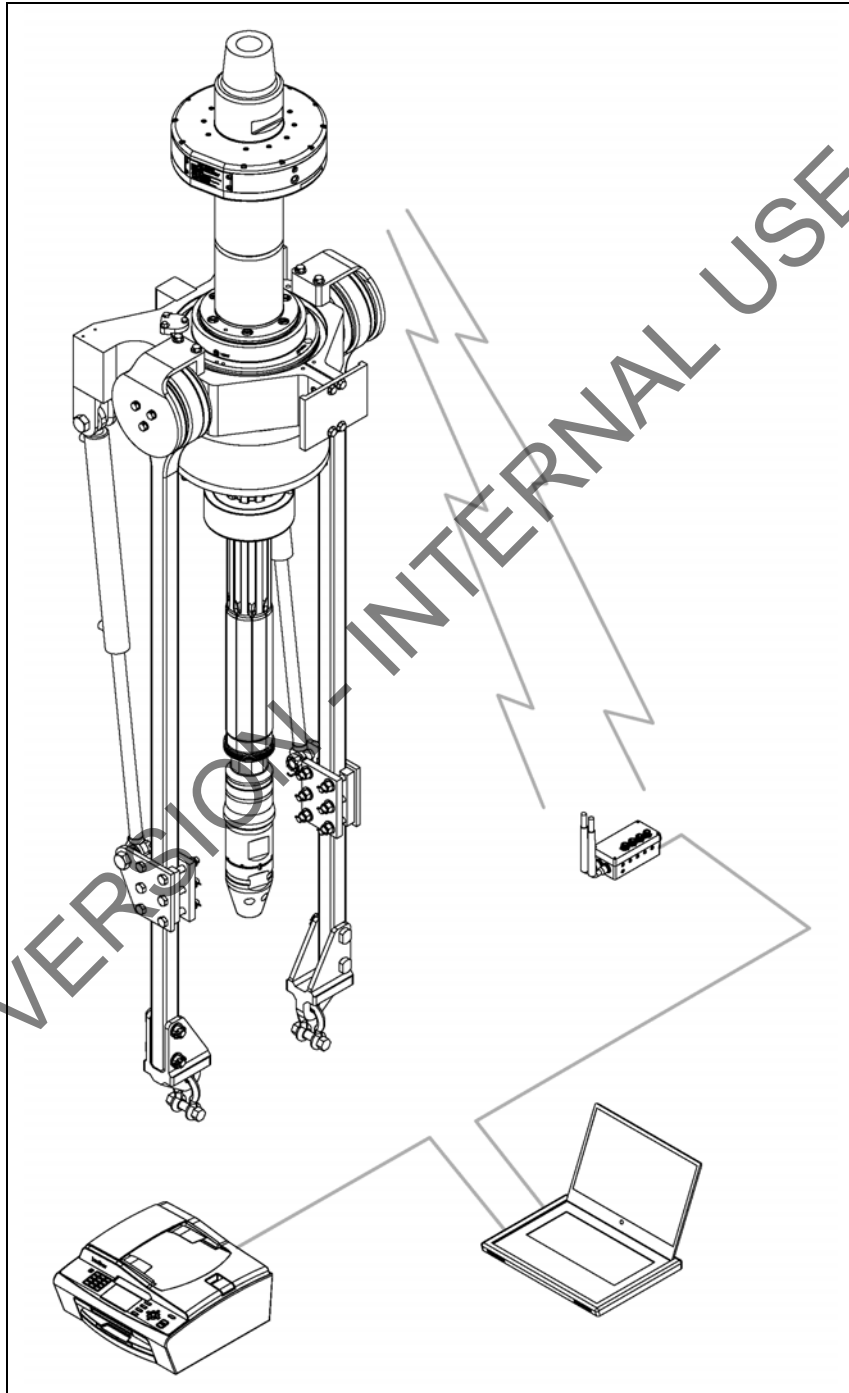
Final Check List Item	Complete	Comments
Box 1 on Truck	<input type="checkbox"/>	
Box 2 on Truck	<input type="checkbox"/>	
Casing Tool on Truck	<input type="checkbox"/>	
Tool Box on Truck	<input type="checkbox"/>	
Pre-Job Forms Completed	<input type="checkbox"/>	
Directions To The Rig	<input type="checkbox"/>	
Communications Devices	<input type="checkbox"/>	
Personal Computer	<input type="checkbox"/>	
Fuel For The Vehicle	<input type="checkbox"/>	
<b>Additional Items</b>	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	
	<input type="checkbox"/>	

**The above check was performed by:**

Name (print):	Signature:
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# APPENDIX C: TTS GENERAL ASSEMBLY

## TORQUE AND RPM WIRELESS NETWORK



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