

# Operator's Manual

## TorqueStar Plus / Pro Data Collector

Manual 1293-01 Issue 3  
Crane Electronics Ltd



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## ADDRESS

<b>Manufacturer:</b>	Crane Electronics Ltd
<b>Address:</b>	3 Watling Drive Sketchley Meadows Hinckley Leicestershire LE10 3EY
<b>Tel:</b>	+44 (0)1455 25 14 88
<b>Technical Support:</b>	<a href="mailto:support@crane-electronics.com">support@crane-electronics.com</a>
<b>Sales:</b>	<a href="mailto:sales@crane-electronics.com">sales@crane-electronics.com</a>

## UKCA MARKING

Crane Electronics Limited declares that the TorqueStar range has been assessed and complies with the UK regulatory requirements.



## CE MARKING

Crane Electronics Limited declares that the TorqueStar range has been assessed and complies with the requirements of the relevant CE Directives.



## COMPLIANCE

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.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installations. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## PRODUCT DISPOSAL

### Applicable in the EU and other European Countries with separate collection systems



The symbol shown here and, on the product, means that the product is classed as Electrical or Electronics Equipment and should not be disposed with normal commercial waste at the end of its working life.

The Waste of Electrical and Electronics Equipment (WEEE) Directive (2012/19/EU) has been put in place to recycle products using best available recovery and recycling techniques to minimise the impact on the environment, treat any hazardous substances and avoid the increasing landfill.

To enable this product to be disposed of properly i.e., cradle to grave, Crane Electronics is willing to accept the return of your product (at your cost) for recycling or alternatively, for more detailed information about recycling of this product please contact your local authority or the Distributor / Company where you have purchased the product.

Battery disposal to take place in line with the AMENDED BATTERIES DIRECTIVE 2013/56/EU. Batteries must **not** go to landfill. Check with local legislation.

Crane Electronics declares that this product does not contain any of the 191 Substances of Very High Concern (SVHC's) identified in the REACH Regulation in used articles make-up.

### In Countries outside the EU:

If you wish to discard this product, please contact your local authorities and ask for the correct way of disposal.

Signed for & on behalf of **Crane Electronics Ltd.**

Name: **B. M. Etter**  
Title: **Safety & Environmental Advisor**

Signature of Issuer: 

## WARNINGS



**Changes or modifications to the TorqueStar range not expressly approved by Crane Electronics Ltd could void the user's authority to operate the equipment.**

## ABOUT THIS MANUAL

This manual covers the TorqueStar Plus / Pro versions, working with our range of torque transducers and digital torque wrenches.



Actual screen shots represented in this manual may differ slightly from those on the actual TorqueStar unit, depending on the version.

For information on the operation of one of our digital torque wrenches or torque transducers, please refer to their own manuals.

Software version: TorqueStar Plus / Pro

## PACKING LIST

The following Items are supplied with the **TorqueStar Pro** dependent on model specification purchased.

- 1 x TorqueStar Plus / Pro
- 1 x Calibration Certificate
- 1 x Quick Start Guide (with QR code link to operator's manual)
- 1 x 5V PSU Power Adapter
- 1 x USB to Micro USB connection cable
- 1 x USB Flash Drive
- 1 x Carry Lanyard
- 1 x Type A-A USB Cable (Pro Only)

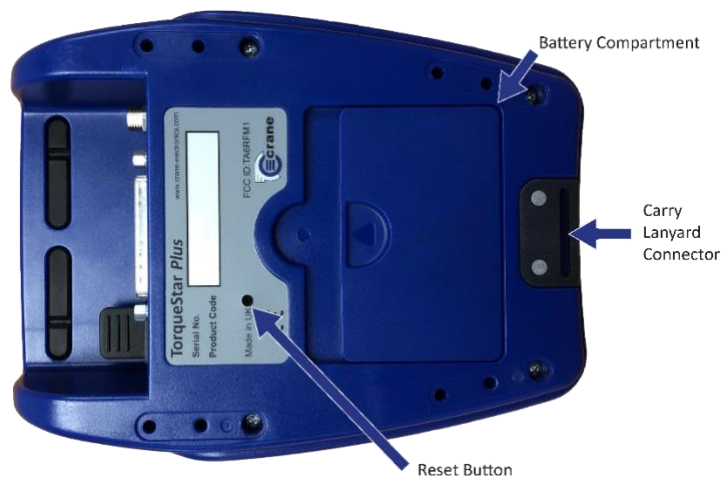
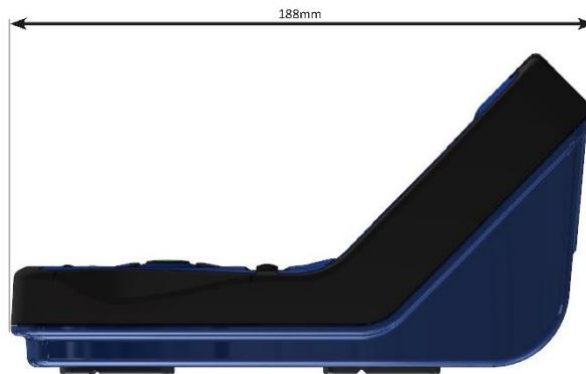
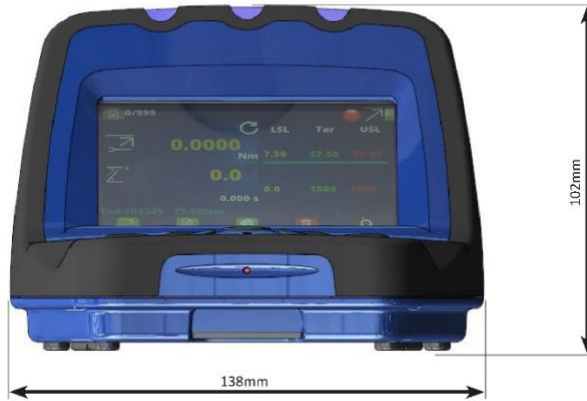
Please ensure all items are present and notify Crane Electronics Ltd immediately of any shortages.



## SPARES AND ACCESSORIES

Additional Batteries	080159
5V PSU Power Adapter	TSXXA – 0000 - CRPXXX
External battery charger	TSXXA – 0000 - CRCXXX
USB to Micro USB connection cable	090301
Carry Lanyard	110385
USB Flash Drive	POA
Type A-A USB Cable	POA

## FEATURES AND DIMENSIONS



## SPECIFICATIONS

### Measurement Modes:

- Track** – Real time torque
- Peak** – Capture of the highest torque
- Pulse** – Special measurement algorithm for use with impulse tools, incorporating pulse count
- Click** – Special measurement algorithm for use with click tools
- Force** – Capture of peak force during cycle
- Audit** – Special measurement algorithm that measures torque after joint moves a certain angle
- Yield** – Special measurement algorithm that measures torque after joint goes into yield (Pro only)
- MoveOn** – Special measurement algorithm that measures torque of previously tightened joint (Pro only)
- Retightened** – Special measurement algorithm that untightens a fastened joint and retightens to the same angle (Pro only)

### Measurement Units:

**Torque** – Nm, lbft, lbin, MNm, Ncm, kgcm, kgm, kNm, klbft, Nmm, ozin

**Force** – kg, kkg, lb, klb, N, kN

### Physical Measurements:

Auto Bi-directional torque; angle\*; pulse count; RPM in track mode\*; cycle time duration (\*when using rotary transducer).

### Compatible Input Devices:

IS, UTA, and Multi, including WrenchStar Multi, cable products compatible, analogue or digital.

### Plug & Play Transducer Data:

Auto ID of all Crane UTA/Multi products. The following information is read from the chip in the transducer - torque range, angle encoder data, serial number, calibration due date.

### Data Storage:

999 readings in 'Check' and 20,000 readings in 'Jobs'.

### Basic Statistics:

Count, range, mean, min, max, standard deviation.

### Advanced Statistics:

Cm, Cmk, Cp, Cpk

### Auto Print / Data Output:

Easy selectable output to AutoPrint or CSV. Interface to simple PC package that outputs the print data to an Excel spreadsheet.

### Cycle Status Indication:

Audible buzzer and LED HI/OK/LO torque status. User definable.

### Operating Languages:

English, Chinese, Czech, French, German, Italian, Spanish, Swedish, Polish, Portuguese, Turkish



## HARDWARE

### Construction:

High strength injection moulding. Protective rubberised trim to alleviate secondary damage. Soft rubber trim surrounding tough internal chassis. Can survive 1.8m drop.

### Display:

Colour Backlit 4" screen (86mm x 52mm)

### Keypad:

Easy clean keypad. 11 Keys including 5 function keys, 5 soft directional keys and on/off key.

### Power:

Universal 5V charger or USB charger.

### Power Management:

User selectable auto power-off: Between 0 - 200 minutes. Screen contrast and brightness adjustment.

### Battery Pack:

Lithium Ion - User swappable. Charge time: 3 hours with appropriate charger current. Chargeable via USB or 5V charger. Typical operating time: 4 hours continuous use.

### Input/output ports:

25 pin 'D' type transducer port (female) (digital or analogue).

Micro USB (2.0) for power and export.

Standard USB type A (on-the-go).

5V DC power port for use with mains power DC charger.

## TECHNICAL FEATURES

### Zero Stability:

$<\pm 0.01\%$  FSD/°C.

### Static Accuracy:

$\pm 0.25\%$  FSD of connected transducer.

### Operating Environment:

Temperature: +5 to +40 °C.

Humidity 10-75% non-condensing.

Ingress protection rating: IP45.

### Torque Measurement

Display to 5 significant figures. Sample every 20 micro seconds.

### Angle Measurement:

Quadrature phase input. Display angle to 0.1 degrees, Sample every 1000 micro seconds.

### Warranty:

12 months parts and labour against faulty workmanship or materials.

## ICONS – TorqueStar Plus/Pro

### Functions:



Check



Jobs



Rounds



Users

### Measurement Modes:



Peak



Click



Track



Pulse



Audit



Peak Angle



Force

### Pro only:



MoveOn



Yield



Re-tighten



MoveOn  
Advanced

### Measurement Functions:



Readings



Delete



Settings



Back

### Settings:



Power



Date / Time



Language



Misc.  
Torque



AutoPrint



Readings



Comments



Unlock



Pro Only



Splash  
screen

**Languages:**



English    French    German    Italian    Spanish    Swedish



Turkish    Czech    Polish    Chinese    Hungarian    Portuguese

**Transducer Screen:**



Transducer    Edit    Refresh    Delete    Back    Accept

**Statistics screen:**



Save    Print    Swap Primary &  
Secondary    Back

**Reading List Screen:**



Readings    Print    Add  
Comment    Statistics    Back

**General:**



Accept /  
Yes    Cancel /  
No    Home

**Keyboard:**



Erase    Shift Key    Enter    Numbers /  
Symbols    Text    Cancel /  
No

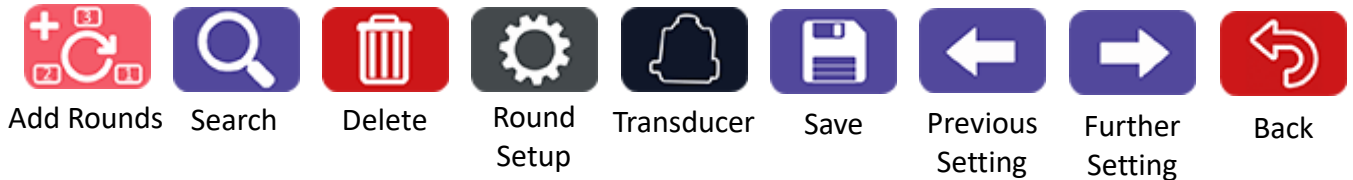
**Job List Screen (Pro only):**



**Job Edit (Pro only):**



**Rounds List & Edit Screens (Pro only):**



**START UP**

**Turning on your TorqueStar:**

Turn on the TorqueStar by pressing the on/off button situated below the arrowed keypad.

Pressing this button whilst the TorqueStar is on will turn it off.



The first screen you will see is as below.



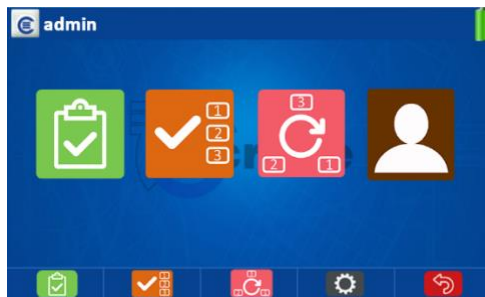
- 1) Model (Plus or Pro)
- 2) Transducers available
- 3) Serial Number S/N, Torque Module latest release, HMI Module latest release, Keyboard latest release
- 4) Advised calibration due date for this data collector
- 5) Features unlocked
- 6) Battery Status

It confirms what version of TorqueStar you have. In the screenshot above it tells you that you can use Analogue and Digital Transducers only. RF Transducers can only be used with the TorqueStar Pro (future option).

In the top right-hand corner it will show the current level of battery life and whether it is being charged or not. Charging is denoted by a lightning flash.

The serial number of the model you have is displayed, along with the latest software release for the Torque Module, HMI Module and Keyboard. The opening screen also shows the calibration due date of the model you have.

If you press the green button or wait the TorqueStar will load its settings for a few seconds and the Home screen will be displayed.

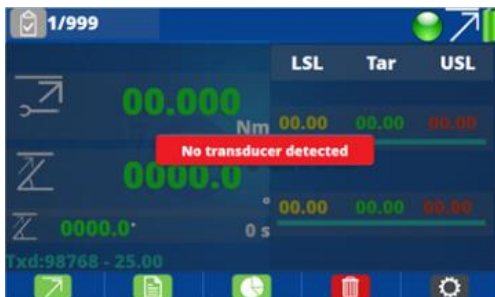


You will notice there are 5 aligned keys with icons displayed along the bottom of the screen. These are soft function keys and their action depends on the icon displayed. F1 is the left hand function key, then F2, F3, F4, and F5 is the right hand function key.

For the TorqueStar Plus, only Check and Settings icons on the lower part of the display are active. The Jobs and Rounds icons will be greyed out as they are only active on the TorqueStar Pro.

Press the Check (F1) icon or use Left and Right arrow keys to highlight required function then press green key.

If no transducer is plugged in then this screen will appear.

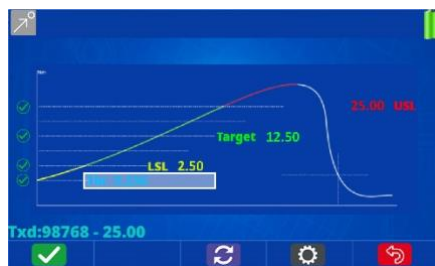


Please connect a transducer. See 'Connecting a Transducer' set up.

If a transducer is already plugged in then, depending on what span Nm (or torque range), it will automatically populate the LSL (lower specification limit), target torque and USL (upper specification limit). If the transducer has angle, this will also automatically be populated.

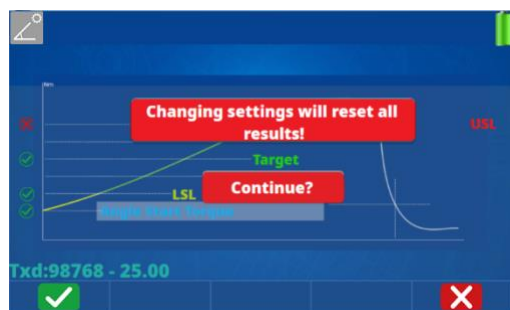


If you wish to change the LSL, target torque and USL, you can toggle using the Up and Down arrow keys to highlight the torque and angle limits. The selected function is within a white rectangle. Press the green button and you will be taken to the screen below. There is a Home icon at the top of the display. If it is highlighted with the Up and Down arrow keys, pressing the green button will take you back to the Home screen.



Use the left and right arrows to move to the Limit that you wish to change. When highlighted press the green button. To change the limits use the Up and Down arrows and the Left and Right arrows to go to another number. Once you have set the desired number, press the green button. Continue following this process until all your limit settings are correct.

If you are changing a transducer or changing the limits then this will reset all the results.



- If all is OK then press the green 'tick'.
- If this screen isn't displayed then press the back button to return to the measuring screen.
- If you change your mind before pressing the green tick icon (F1) then press refresh (F3) to restore original limits.
- The settings icon (F4) takes you to measurement settings.

## INPUTS



**TorqueStar Pro has connectivity using the following:**

- 1) Micro USB (charging or streaming)
- 2) USB (USB stick or OMS Lite)
- 3) 25-way D-type female transducer port
- 4) 5V DC Power Supply

## CHARGING YOUR TORQUESTAR



**Charging can be done in two ways:**

- 1) Connect Micro USB on the TorqueStar to USB on a laptop/PC or USB charger.
- 2) Connect the 5V DC port with a DC power supply.

1

2

## CONNECTING A TRANSDUCER



Plug the male 25-way D-type connection on the transducer to the female connection port on the back of the TorqueStar.



All Crane UTA transducers will automatically be recognised. Industry Standard (IS) Transducers will have to be manually inputted (See transducer set-up).

You can store up to 10 x IS transducers. You can use 1 x UTA transducer and have 10 x IS stored, or you can connect 5 x UTA transducers at the same time by using a 5-Way transducer switching box.



### 5-Way auto transducer switching box:

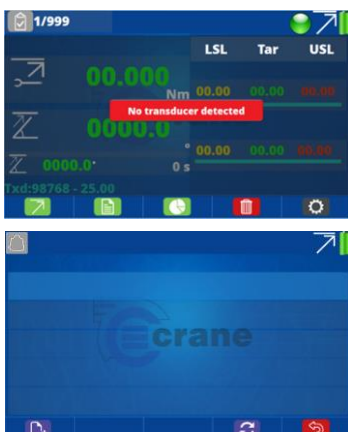
Allows connection of up to 5 transducers and the capability to switch between them with ease. Automatic recognition of UTAs and no hardware modifications are required to connect. Uses 25-way D-type interface.

**Part Number:** TO-899-09CR-0-0

**RS232 Cable Port to Port:** CBL-757-0-0-0-0

**NOTE.** If you are using an auto transducer switching box with the Plus/Pro, you must turn OFF the “**TM Power Save**” setting. This can be found in ‘Battery Settings’. Once this has been switched off, to fully enable it you must then power cycle the TorqueStar Pro Off and On. If the setting is left ‘On’ it can cause an offset error when in measurement mode.

## MANUAL TRANSDUCER SET UP



To manually set up an IS or force transducer select the settings icon from the Measurement screen



and then the transducer icon.



You will come to this screen enabling you to set up a transducer. Press the edit icon



to manually input the transducer you wish to connect.

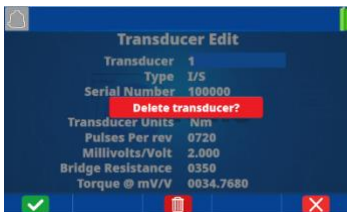




Change the transducer properties by using the Left and Right key. Use the Up and Down arrows to navigate the screen.



Pressing F2 and F4 moves the decimal point.



You can also delete a transducer by pressing the delete icon and press the green button or the green 'tick' to accept and the red 'cross' to not delete.

You can always refresh to pair a UTA to the TorqueStar if you have one attached or search for one by pressing the refresh icon.

**Transducer:** Set the number of the transducer as you see fit. The TorqueStar can store up to 10 transducers.

**Type:** Scroll down to type if you are adding an Industry Standard (IS) or Force transducer. All Crane transducers are automatically recognised and so do not need manual setup. Use arrows to change from IS to Force.

**Serial number:** To input the serial number, use the keypad to highlight the serial number. Press the green button on the keypad to highlight the first digit. Use the Up and Down arrows to change this digit and move left and right to highlight additional digits for editing. Once completed press the green button. Up to 8 digits can be entered.

**Span:** To input the span use the same process as for inputting a serial number. Span values 1 – 8000 are accepted.

**Transducer units:** Select the measurement unit that you wish to use by using the left and right arrow keys. Available are: Nm / lbft / lbin / MNm / Ncm / kgcm / kgm / kNm / klbft / Nmm / ozin if IS transducer and N, kN, kg, kkg, lb, klb if Force transducer.

**Pulses per revolution (PPR), Millivolts/Volt, Bridge resistance, Torque @ mV/V:** To input these details, follow the same process as inputting a serial number. Millivolts/Volt can be between 0.500 to 8.000. Bridge resistance cannot be 0000. PPR = 0 means angle cannot be measured.

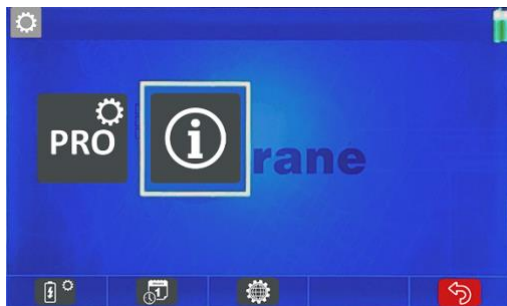
SETTINGS



Settings can be accessed by selecting the Settings Icon on the home screen:



Use Left and Right arrow keys to move between the different settings functions and select the chosen function with the green key.



The 'Back' icon (F5) will take you back to the previous screen.



Power Settings



Date & Time Settings



Language Settings



Misc. Torque Settings



AutoPrint Settings



Readings Settings



Comments Settings



Unlock



TorqueStar Pro Settings



Splash screen

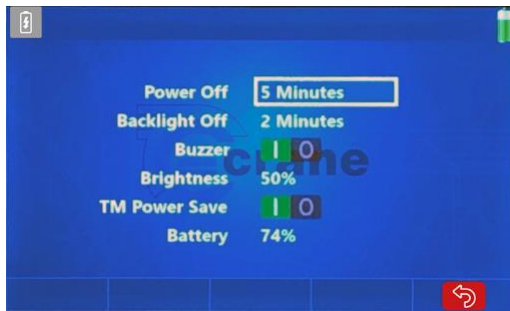
## POWER SETTINGS



Select the Settings Icon.



Select the Power Icon.



You can change the 'Power Off' time by using the Up and Down arrows to highlight the current minutes. Use the Left and Right arrows to toggle between time limits. You can set 'Never Off' or between 1 - 200 minutes.

The same process is followed to change the 'Backlight Off' setting. The 'Buzzer' can be toggled on or off and the 'Brightness' can be changed from 20% - 100%. A lower brightness saves battery power. 'Battery' level is an indicator to the unit's power status. If an external power source is connected, then it will show as 100%.

The 'Backlight Off' time cannot be greater than the 'Power Off' time.

The 'TM Power Save' turns the Torque Module power off when not being used to talk to transducers in measurement mode.

The 'Timer' does not operate if an external power supply is connected.

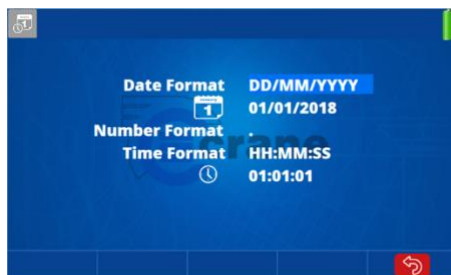
## DATE & TIME SETTINGS



Select the Settings Icon.



Select the Date/Time Icon.



**Date Format** – Using the Up and Down arrows you can navigate. Highlight the 'Date Format' and press of the left or right arrows to change the format. There are three to choose from: DD/MM/YYYY, MM/DD/YYYY, YY/MM/DD.

**Date** – To change the date, highlight the current date stored, press the green OK button and use the Up and Down arrows to change the dates. The Left or Right keys switch between day, month and year. To save, press the green button.

**Number Format** – Dot or Comma for decimal place.

**Time Format** – Set how you want the time displayed. HH:MM:SS, HH:MM using the left and right arrow keys.

**Time** – Highlight the current time, press the green OK button and then you can use the arrow keys to change the time, using the Left and Right arrows to move between the hours, minutes and seconds.

## LANGUAGE SETTINGS



Select the Settings Icon.



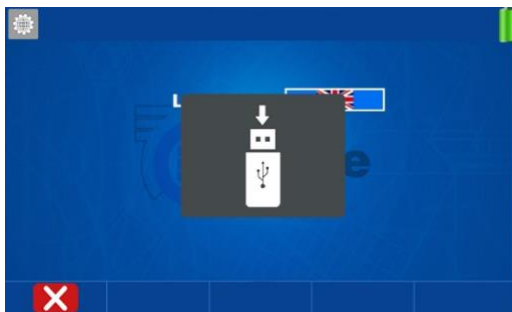
Select the Language Settings Icon.

### Language Settings.

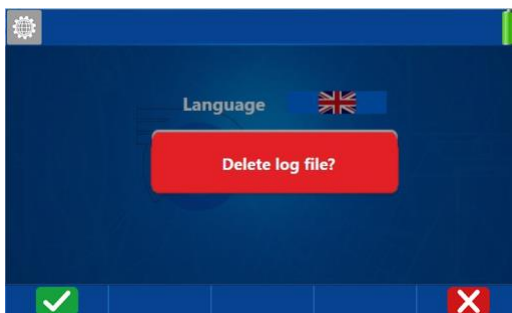
Use the Left and Right arrow keys to change the language in the TorqueStar. Available languages are: English, French, German, Chinese, Polish, Hungarian, Italian, Portuguese, Spanish, Turkish, Swedish, Czech.



The TorqueStar stores a log file to aid the solving of any issues arising in the software.



Save (F1) icon allows the log file to be stored on a USB flash drive automatically. If no USB drive is available, press the cancel icon (F1) to return.



The delete icon allows the log file to be deleted. Press accept or cancel icon.

The logging cannot become full as a FIFO principle is employed to make sure only recent information is recorded.

Stored in \Crane\logs\ folder on the memory stick as file 'log.date-time'.

The log file can also be uploaded into OMS and OMS Lite (Pro only).

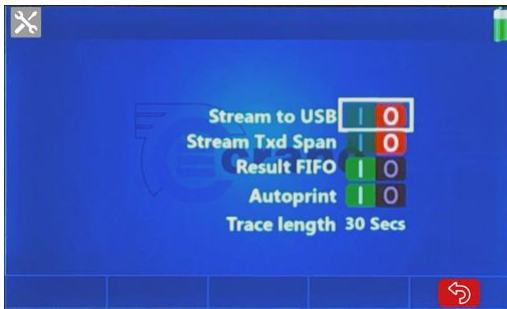
## MISCELLANEOUS TORQUE SETTINGS



Select the Settings Icon.



Select the Misc. Torque Icon.



Use the Up and Down arrows to navigate and use the left and right arrows to set the user requirement.

Stream to USB updates torque value to the USB continuously whilst taking readings. Stream is on Micro USB port. The span of the connected transducer can be added to stream.

FIFO is First In First Out. If off, it can only take 999 readings. If on, you can see the last 999 readings.

Auto Print sets print out for the end of results and in reading list.

Trace length: 0 (No trace), 30s (data point every 1ms), 60s (data point every 2ms) 2 mins, 5 mins, 10 mins, 20 mins, 1 hour, 2 hours, 4 hours, 10 hours.

## AUTOPRINT SETTINGS



Select the Settings Icon.



Select the AutoPrint Icon.



### AutoPrint set-up.

Use the left and right arrows to change the settings, use the up and down arrows to scroll through the menus.

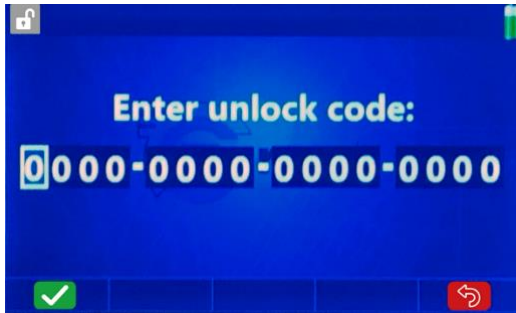
## UNLOCK



Select the Settings Icon.



Select the Unlock Icon.



The unlock code can be provided by Crane to enable features on the TorqueStar. With no unlock code the TorqueStar will show 'Demo' on the splash screen and will work in basic Plus mode. The Plus unlock code removes 'Demo' from the splash screen.

Plus with 'Graphs' unlock code allows traces of readings to be viewed and advanced statistics. These come as standard on Pro.

Pro unlock code upgrades Plus to Pro. The same hardware and firmware is used so the unit does not need to be returned to Crane. The unlock code is remembered when the TorqueStar is turned off/on.

Select digit position with Left and Right arrow keys. Select the Hex number (0 – 9 A – F) with Up and Down arrow keys. Click accept (F1) icon when code is entered. **NOTE:** the unlock code is dependent on the serial number of the TorqueStar so it cannot be shared between devices.

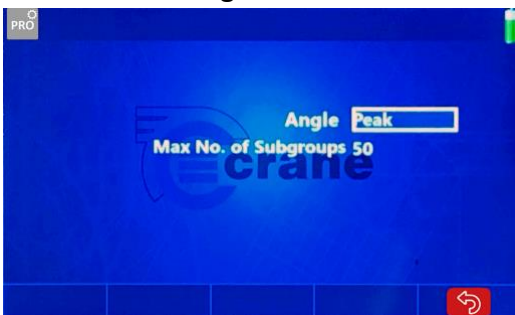
## PRO SETTINGS (TorqueStar Pro Only)



Select the Settings Icon.



Select the Pro Settings Icon.



Angle Value can be set as:

- Peak (Angle at Peak Torque)
- Final (Angle seen before torque goes below Angle Start Torque for the final time)

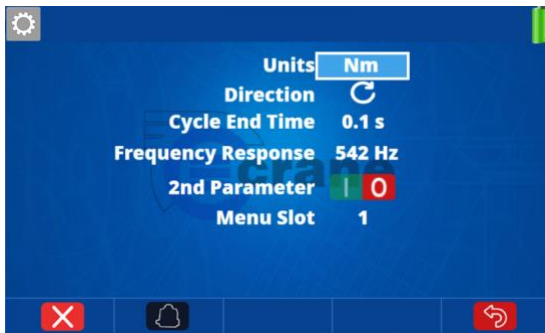
Max. No. of Subgroups

- Set by OMS Lite and is maximum number of subgroups per job. It affects the maximum number of jobs it can store (NOTE. the number of jobs stored is also affected by number of readings per subgroup and can only save a maximum of 20,000 readings).

## SETTINGS MEASUREMENT SCREEN



Select the Settings Icon, when on a measurement screen.



Using the Up and Down arrows on the device you can select the setting that you require. Using the Left and Right arrows will change the setting to what you require.

Once completed you can press the return key to go back to the measurement screen.

Units = Displayed torque units

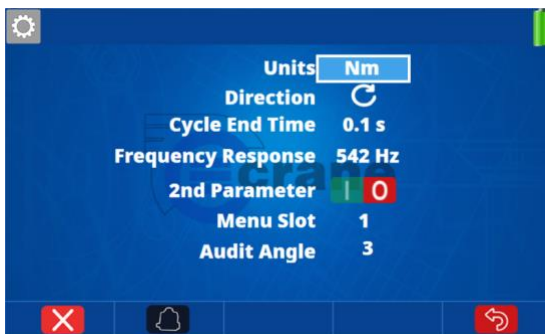
Direction = Clockwise, Anti-clockwise, Auto

Cycle end time = 0.2s, 0.5s, 1.0s, 2.0s, 5.0s, 10.0s, 20.0s

Freq. response = (Hz) 75, 151, 256, 307, 384, 542, 768, 921, 1024, 1316, 1536, 2304, 3072, 4608

The Menu Slot is the number from the left of the screen that the measurement icon occupies

Audit Angle is shown when measure mode is Audit.



## CHECK MEASURING SCREEN

Measuring Screen:



The symbols across the top of the screen are:



Top-left corner icon that appears is relevant to the screen you are currently on.



The TorqueStar has 999 readings capability. Number of readings are displayed. (Changes from /999 to +000 when it has more than 999 FIFO readings)



Selecting this icon will take you back to the Home Screen.



If this Icon is Green it means that everything is ready to measure.



If this icon is Red then something needs to be actioned and it cannot take a measurement.



Current 'Measurement Mode' is displayed



Battery level indicator. A flash will appear when charging.

### Measurement screen

LSL	Tar	USL
2.50	12.50	25.00
0.0	1500	3000

LSL = Lower Specification Limits  
 Tar = Target Torque  
 USL = Upper Specification Limits

If a reading is below the target torque a number of things will happen:

1. Torque reading will be yellow when the fixing is under-tightened.
2. An audible, single beep will be emitted.
3. The yellow LED light on the TorqueStar will illuminate.

If the target torque is achieved there will be two audible beeps and the TorqueStar's green LED will illuminate. If the USL is reached then the fixing is too tight the torque reading will be in red and three audible beeps will be heard and the red LED will illuminate.

The top reading is the torque measurement value and the lower readings will be angle (or secondary parameter) if applicable.



- No limits shown for Track mode.
- Secondary parameter limits are not shown if not selected in measure settings.
- In Click measurement mode, the Click Dip threshold is set in torque limit settings.



Measurement mode:  12.276 Nm

Angle:  010.17

Duration: 2.362s

Transducer serial no. Txd:98768 - 25.00

Direction of rotation: 






Last reading taken: Nm

Last angle measurement: Angle

- Duration is corrected at the end to remove cycle end time.
- No direction icon shown for Track mode (CW is positive torque, CCW is negative torque).
- In Audit measure mode an audit angle will be shown below secondary parameter.
- In Track mode, it shows torque, angle and rpm.



The symbols across the bottom of the screen are your action keys. Pressing the corresponding soft-key will give you access to other modes and settings.


-  Choose Measurement Mode
-  Readings list
-  Delete
-  Measurement Settings
-  Back

## MEASUREMENT OPTIONS

On the front Measuring Screen press the 'Measurement Mode' Icon.

You will then see four different Measuring Modes.



Pressing the 'shift' arrow icon  will take you to additional measurement modes.



Peak

Peak Angle

Click

Track



Pulse

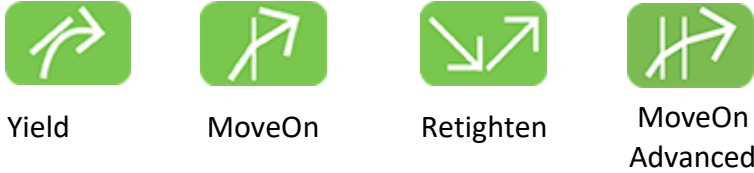
Audit

Force



**Pro Only:**

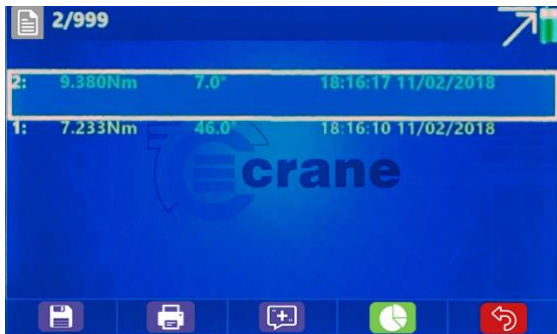
There are 4 additional measurement modes available with the TorqueStar Pro:



When you select the measurement mode you require, you are taken back to the measurement screen and, as long as a transducer is connected, you can begin to measure.



Pressing the readings list icon  will take you to the readings screen.



The 'Save' icon will let you save your reading to a USB stick. Insert the USB stick and save to USB. For further information go to the 'Saving – USB' section in this manual.

**Saving readings to a USB device:**

Insert a USB device into the back of the TorqueStar. The standard USB socket can be located at the rear of the unit and is sealed with a plastic protector. Remove the protector and insert the USB device.



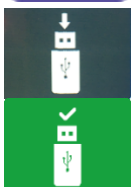
USB port protector.



Insert USB.



When clicking on the Save Icon, you will be asked to insert a USB Stick. The USB Icon will appear on the screen.



The USB Memory Stick icon will automatically go green and save the readings to the USB Stick if attached.

Saves in folder \Crane\Export  
 Filename [MeasureMode] Date\_Time.csv  
 Date & time format altered in settings represents the time of export.

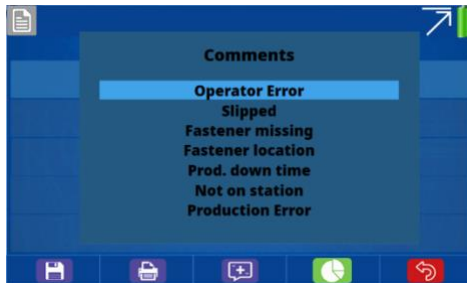
We recommend you use the USB flash drive supplied with the TorqueStar (16GB USB 2.0). It is formatted as FAT32.



The 'Print' icon will allow you to print all your readings using format in Auto Print settings.



Pressing the 'Add Comment' icon will open a window of text comments. These are different comments the user is able to add to a reading to give details of any issues that occurred during the tightening process. Once the required text is highlighted press the 'ok' key to confirm and add this to the reading.



**Comments Available:**

Operator Error / Slipped / Fastener Missing / Fastener Location / Prod. Down time / Not on Station / Production Error / Patch Bolt Set / Loose Fastener / Wrong Fastener / Wrong Tool / Tool Malfunction / Low Volume / Track Stop / Crossed Thread / Stripped / Bad Part / Part Shortage / Not Determined



View Statistics of the Readings (see next page).



The 'Back' icon will take you back at any time to the measurement screen.

**READING TRACE**



When in the reading list, pressing the green button for a selected reading will show a graph of the readings.



The icon switches between Torque vs Time, Angle vs Time and Torque vs Angle.

A red cross (cursor) will highlight the feature found on that measure mode. You can zoom in (except on Torque vs. Angle)

The up and down arrow keys change the speed of cursor movement. The parameter values at the cursor position are displayed on the right-hand side of the graph. The plus and minus icons allow you to zoom in and out of the trace. Zoom in centres on the cursor and you can zoom in until all trace points are displayed.

The save icon saves the results.

Save to folder \Crane\Traces\ [MeasureMode] Date\_Time.csv

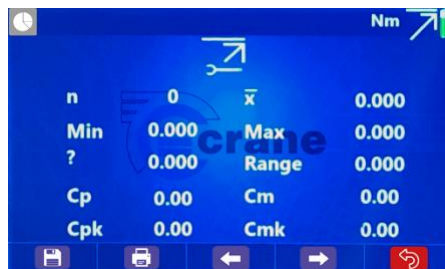
If taking more than 999 readings (FIFO on) you will only see traces for the last 998 readings.

## STATISTICS

### Statistics

This will show various different statistics taken from the readings taken by the user. They are as follows:

- Qty
- Mean
- Min
- Max
- Sigma
- Range
- Cp
- Cm
- Cpk
- Cmk



You can save these statistics to USB by connecting the USB memory stick into the back of the TorqueStar and pressing the button corresponding to the 'save' icon (F1). This will then open up another window where the user can save these values. Name Statistics Date.Time.csv in \Crane\Export. The statistics are for displayed parameter.



The device also gives the unit the option to print out the statistics, this is done by connecting a printer and then pressing the keyboard button which corresponds with the 'printer' icon (F2).




Swap between displaying Primary and Secondary parameters.





The 'Back' icon will take you back at any time to the measurement screen.

## DELETION

### Measuring Screen:

If you have taken a reading and you wish to delete it, you can press the 'Delete' icon  on the screen.

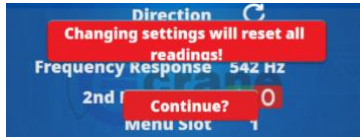
This will then send you to the delete screen where you can either accept the deletion  or reject it.  You can also use the Up and Down arrows to select 'Delete All' and this will delete all of the readings currently taken.



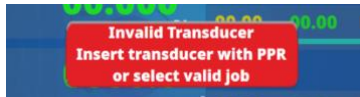
## WARNING SCREENS



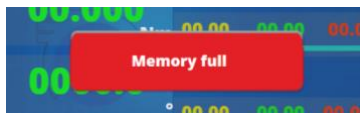
Below are a series of warning screens that can appear during operation of the TorqueStar:



If you decide to change settings whilst in the middle of readings then you will be warned. If this is what you wish to do then press the green button, if not press the button.



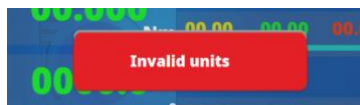
Warning messages similar to this will appear if you try and attach or select the wrong transducer for the job required.



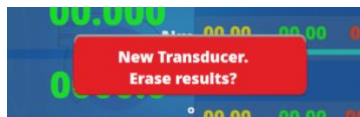
The TorqueStar will warn you if your memory is full. You will need to upload to a USB, print out your results or delete readings.



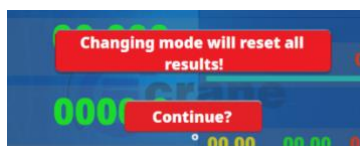
If you are trying to select a transducer that is not compatible or choose the wrong one then you will be issued with a warning message. You can go back using the red 'back' key.



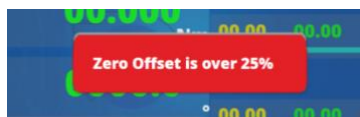
If you have selected the wrong units then you will see this message.



If you attach a new transducer whilst in the middle of readings then this will erase all the results. Press the green 'tick' or the red 'cross'.



Whilst in measuring mode with a selected transducer if you decide to change the measurement mode then all reading results will be reset.



If you start pulling torque before you are in the measuring screen then you will be warned that the 'Zero Offset' is over-ridden by a certain %.



First phase in retighten measure mode. Untighten in CCW direction.



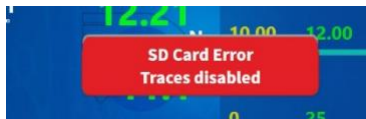
Second phase in retighten measure mode. Retighten in CW direction until specified audit angle is reached.



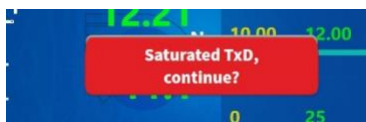
Unfasten torque has to be greater than 10% of attached transducer span.



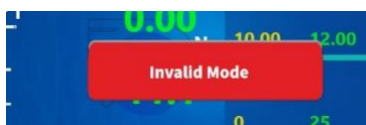
Invalid unlock code. Check code HEX and re-enter. Make sure it is the correct code for the device serial number.



If there is a problem with the internal SD card then traces will be disabled.



Over-torqued transducer.



Invalid mode, e.g. trying to use a force transducer for a torque measurement.


## TORQUESTAR PRO FEATURES


### VIRTUAL KEYBOARD


When text input is required a virtual keyboard will appear on the screen.





Use the arrow keys to highlight the required character and press the green button to select it.

If you make a mistake, use the 'Backspace/Erase' icon  (F1) to delete the previous character.

Use the 'Shift' icon  (F2) to change between upper and lower case characters.

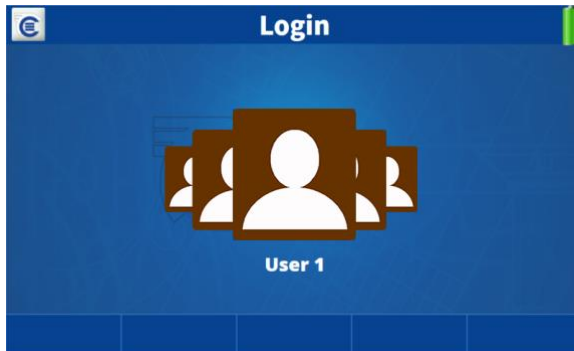
Use the 'Symbol' icon  (F4) to allow numbers and special characters to be selected.

To exit the keyboard, use the 'Cancel' icon  (F5) or 'Enter'  (F3) if you wish to accept the entry.

If a barcode scanner (Model Tera 5100) is connected to a Type A USB, then you can scan the input and automatically accept.

## LOGIN SCREEN

On the TorqueStar Pro, after leaving the splash screen after powering on, you will enter the login screen.



The users can be downloaded from OMS (Lite).

The users can be highlighted with the Left and Right arrow keys then selected by pressing the green button. When a user is selected, the virtual keyboard appears so the password can be entered.

There is a default user called 'admin' with password 'Admin' (Upper case 'A').

If the password is correctly entered then you are taken to the Home screen and the username appears in the top left of the display so you know who is logged in.

If you press the back icon (F5) in the Home screen then you will return to the Login screen and another user can then log in.

## COMMUNICATION WITH OMS LITE

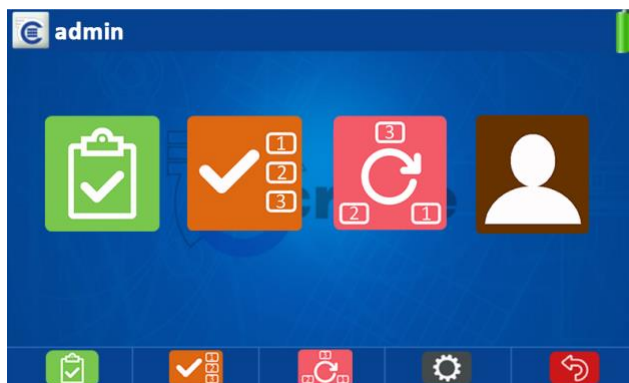
When the TorqueStar Pro is in the Home screen it can communicate with OMS Lite (and OMS).

Connect the Pro to a PC running OMS Lite using a type A-A USB cable.

Jobs, Rounds and Users can be downloaded to the Pro and readings uploaded.

## HOME SCREEN (PRO ONLY)

All of the icons on the Home screen are active:



Check (F1) – has functionality described earlier in manual





Jobs (F2) – described later in manual



Rounds (F3) – described later in manual



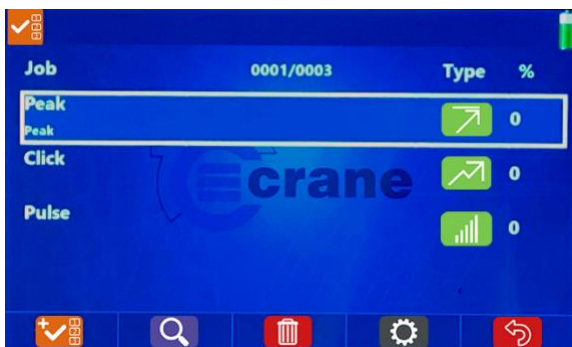
Settings (F4) – has functionality described earlier in manual



Back (F5) – returns to the Login screen

## JOBS

See a list of jobs downloaded from OMS Lite or created on the TorqueStar Pro.



**(F1) Add Job:** (NOTE. you cannot edit jobs downloaded from OMS Lite, just view them)

Once on the 'Add Job' screen, you can move between job settings screens with (F4) and (F3) icons.

You can save the changes to job settings with save (F1) and return without saving with back (F5).

Screen 1:

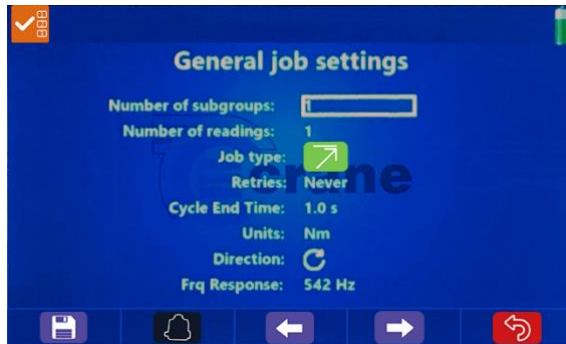


Job Name = (appears in Job list)

Job Description = (appears below Job name in Job list)



Screen 2: General Job Settings



Number of subgroups = (1 – number in global settings)

Number of readings = (1 – 50)

Job Type = (Peak, Impulse, Yield, MoveOn, Angle Control, Audit, Force, Retighten, Click Dip)

Retries = (Never, Always, Manual, Single)

Cycle End Time = (0.2s, 0.5s, 1.0s, 2.0s, 5.0s, 10.0s, 20.0s)

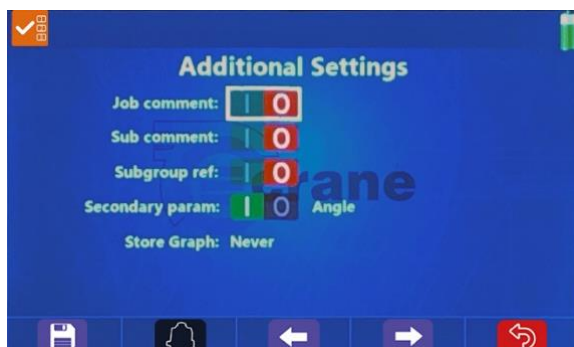
Units = (Change if force or torque job type)

Direction = (CW, CCW, Auto)

Frequency Response



Screen 3: Additional Settings



Job Comment

Subgroup Comment

Subgroup Reference

(For each of the above it can state if it occurs before or after)

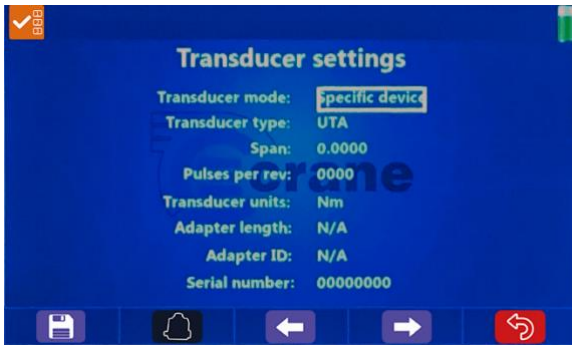
Secondary Parameter = (Could be angle, pulse count or peak torque depending on job type)

Store Graph = (Never, Always, Manual, NOK)

Audit Angle = (1 – 0 degrees) (Appears if Audit Job Type selected)



Screen 4: Transducer Settings



Transducer Mode = (Any appropriate, Fixed Type, Specific Device)

Transducer Type = (UTA, IS, CheckStar Multi, Wrench)

Span = (1 – 8000)

Pulses per rev (PPR)

Transducer Units

Adapter Length

Adapter ID

Serial Number = (Up to 8 digits)

If transducer mode is 'any appropriate' then any transducer can be used with the job and at the point of use, it will check the transducer span against job limits (e.g.  $\text{Span} \geq \text{USL}$  and  $10\% \text{ Span} \leq \text{LSL}$ ).

If transducer mode is 'fixed' type, then the transducer used must match:

- Transducer Type (UTA, IS, CheckStar Multi, Wrench)
- Span
- PPR
- Transducer Units
- Adapter Length (if wrench)
- Adapter ID (if wrench)



If transducer mode is 'specific device', the same as above for 'fixed type' applies, plus the serial number of the transducer to be used.



Screen 5: Primary Parameter Limits & Screen 6: Secondary Parameter limits (if enabled)



Similar to the same screen within 'Check' mode.

When adjusting limits (as 'any appropriate') you can adjust the decimal point with (F2)  (move decimal point to left) or (F4)  (move decimal point to the right).



**(F2) Search Job List:** Job list allows you to enter a search string which will only display job names containing that string.



**(F3) Delete:** Allows you to delete a selected Job.



**(F4) Job Setup:** Same screens as 'Add Job' but to you can view or edit job (if created locally and no readings are taken).

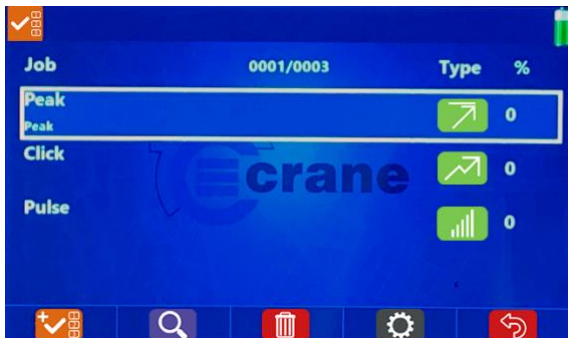


**(F5) Back:** Return to the main screen.

When listing jobs, you can see up to 4 at a time. Use the up and down arrow keys to scroll through the job list. Pressing the green key on a highlighted job enters the job measurement mode.

The job list shows - in the top middle of the display - which job number it is in the list and how many there are in total.

Against each job it also displays the job type (e.g. peak) and the percentage of completion.




## JOB MEASUREMENT SCREEN



Similar to Check measurement screen plus:

S:X/Y = Informs which subgroup 'X' out of 'Y' you are in.

Job Name = (e.g. JOB1) is top centre of the display.

 Unlocked = (Can take readings)

 Locked = (Completed all readings)



Select the Switch View icon  to switch between:

- Line Graph = (Readings with LSL & USL limits)
- Torque Thresholds = (View Torque Limits)

## JOB READING LIST SCREEN



The screenshot shows a 'Job Reading List' screen. At the top, it displays '4/4 S:1/1 Peak2'. Below the header, there are 'JobComment:' and 'Sub Comment:' fields. The main display area shows a table of job readings:

Subgroup	Reading	Offset	Time	Date
4/4	11.673Nm	0.9	12:53:47	14/05/2019
3/4	6.752Nm	-0.1	12:53:43	14/05/2019
2/4	10.776Nm	-1.8	12:53:40	14/05/2019
1/4	11.559Nm	-1.6	12:53:37	14/05/2019

At the bottom, there are navigation icons.

Similar to 'Check' reading list screen plus:

Can swap between subgroups using the Left and Right arrow keys.

Colour of reading is: LO = Amber

OK = Green

HI = Red

Comment can be added for each subgroup and Job.

## JOB STATISTICS



The screenshot shows a 'Job Statistics' screen. At the top, it displays 'S:1/1 Peak2 Nm'. Below the header, there are 'JobComment:' and 'Sub Comment:' fields. The main display area shows individual subgroup basic statistics:

Statistic	Value	Statistic	Value
n	4	$\bar{x}$	10.190
Min	6.752	Max	11.673
?	2.326	Range	4.921

At the bottom, there are navigation icons.

Similar to 'Check Statistics' screen plus:

Can see the following using the Left and Right arrow keys:

- Individual subgroup basic statistics



The screenshot shows a 'Job Statistics' screen. At the top, it displays 'S:-/ JOB1 Nm'. Below the header, there are 'JobComment:' and 'Sub Comment:' fields. The main display area shows overall job basic and advanced statistics:

Statistic	Value	Statistic	Value
n	10	$\bar{x}$	9.919
Min	5.873	Max	11.060
$\sigma$	1.488	Range	5.186
Cp	0.56	Cm	0.65
Cpk	-0.02	Cmk	-0.02

At the bottom, there are navigation icons.

- Overall Job basic and advanced statistics

## ROUNDS



You can view the Rounds downloaded or created on the TorqueStar Pro.





You can move through the list (up to 4 rounds displayed) using the up and down arrow keys. Each item in the list will show a round name and description, the round type, and the percentage of completion.

The round position in the list and the total number of rounds is displayed in the top middle of the display.



**(F1) Add Rounds** (NOTE. you cannot edit or delete rounds downloaded from OMS Lite)

You can move between rounds settings screens with  (F4) and  (F3) icons.

Screen 1:



Round Name = (appear on Round list screen)

Round Description

Directions:

Any order = Select any Job from the Round Job List using Up and Down arrow keys.

Vertical = Start at the first Job in the Round Job List then after completing a subgroup in the previous Job, start the subgroup in the next job on the list.

Horizontal = Start at the first Job in vertical Job List then perform 1 reading from each Job in the list, before repeating the process.

Prompt = Prompt after finishing last job before starting next

**NOTE.** You cannot add the same Job to more than one Round on the TorqueStar Pro. (It is possible that Rounds downloaded from OMS Lite might contain the same Job).



Screen 2: Select Jobs



Select Jobs from the list using Up and Down arrow keys and press Enter.

The selected Job will turn green (If you make a mistake, select the job again and it will turn white).



Screen 3: Select Order



Select Job from the list using the Up and Down arrow keys.

Pressing the Left and Right arrow keys will shift the selected Job up and down the list.



(F2) Search for Round



(F3) Delete Round



(F4) Round Setup



(F5) Back to main screen

If you press the green key on a selected round, it enters this round. If this is an 'any order' round, then you can choose a job from the job list using the arrow keys or search (F1). Otherwise for vertical and horizontal round types, the Pro starts at the beginning of the list.

Pressing Back (F5) takes you back to the round list.

## CONTACT US

To get in touch with Crane Electronics, please go to <https://crane-electronics.com/contact-us/>

### Crane Electronics Inc - if you are based in North America (Canada, USA, Mexico)

1260 11th Street West



Milan  
Illinois 61264  
USA



+1 309-787-1263



[salesusa@crane-electronics.com](mailto:salesusa@crane-electronics.com)



[supportusa@crane-electronics.com](mailto:supportusa@crane-electronics.com)



[serviceusa@crane-electronics.com](mailto:serviceusa@crane-electronics.com)



[www.crane-electronics.com](http://www.crane-electronics.com)

### Crane Electronics Ltd - if you are based in the UK, Europe, Asia, Africa, or Middle East

Watling Drive



Sketchley Meadows  
Hinckley LE10 3EY  
United Kingdom



+44 (0)1455 25 14 88



[sales@crane-electronics.com](mailto:sales@crane-electronics.com)



[support@crane-electronics.com](mailto:support@crane-electronics.com)



[service@crane-electronics.com](mailto:service@crane-electronics.com)



[www.crane-electronics.com](http://www.crane-electronics.com)

### Crane Electronics GmbH - if you are based in Germany, Austria and Switzerland (German speaking)

Im Rank 5



73655 Plüderhausen  
Germany



+49 (0) 7181 9884-0



[salesDE@crane-electronics.com](mailto:salesDE@crane-electronics.com)



[supportDE@crane-electronics.com](mailto:supportDE@crane-electronics.com)



[serviceDE@crane-electronics.com](mailto:serviceDE@crane-electronics.com)



[www.crane-electronics.com](http://www.crane-electronics.com)