

Operators Manual

WRENCHSTAR MULTI Manual 1230-01 Issue 1 Crane Electronics Ltd



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CE MARKING

Manufacturer: Crane Electronics Ltd

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Declares that this product has been assessed and complies with the requirements of the relevant CE Directives.



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

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.

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 when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur, in a particular installation. 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 to 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 (2002/96/EC) 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.

For more detailed information about recycling of this product please contact your local authority or the Company where you have purchased the product.

Battery pack disposal to take place in line with the AMENDED BATTERIES DIRECTIVE 2013/56/EU.

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.

ABOUT THIS MANUAL

This manual covers the WrenchStar Multi communicating with an IQVu.

For information on torque transducers or PC software to be used in conjunction with IQVu, please refer to Corresponding manuals accordingly.



Actual screen shots represented in this manual may differ slightly from those within the IQVu app depending on version

For information on the operation of an IQVu please refer to its own manual.

Software Version of IQVu app =

Software Version of Torque Module =
a) Main processor: 160_vx.x
b) RF processor: 162_vx.x

Software Version of TCI =
a) Main processor: 184_vx.x
b) RF processor: 162_vx.x

Software Version of WSM =
a) Main processor: 182_vx.x
b) RF processor: 161_vx.x

PACKING LIST

The following items are supplied with the WrenchStar Multi dependant on model specification purchased.

1 x WrenchStar Multi
1 x User Manual (USB)
1 x Quick Start Guide (USB)
1 x Calibration Certificate

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

SPARES AND ACCESSORIES

DIN Adaptor
Battery Pack
Charging Cradle + Power Supply Unit
Charger
Cable

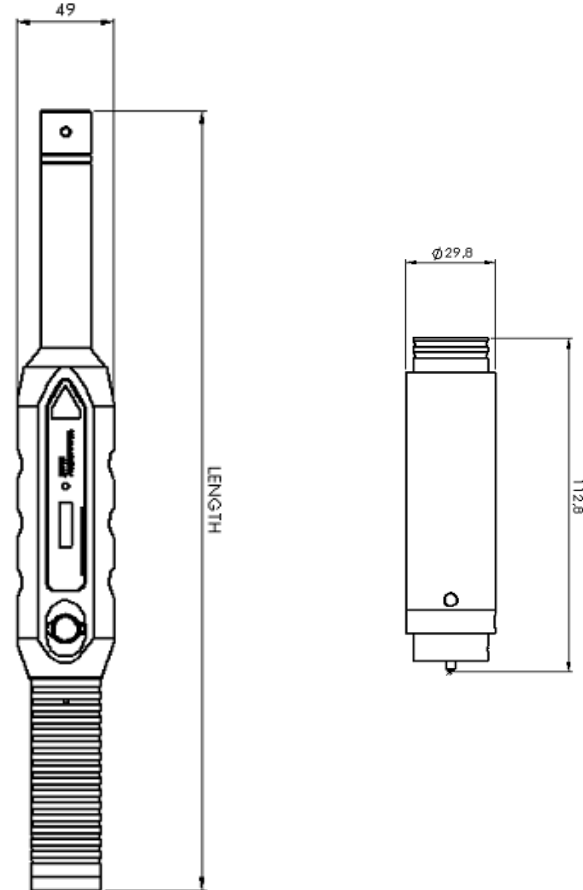
CARE AND STORAGE

Operating temperature range	-20 to +50 degrees C
Storage temperature range	-20 to +50 degrees C
Humidity	10-75% non-condensing
IP Rating	IP40 (indoor use only)

The WrenchStar Multi may be wiped clean with a soft cloth.

FEATURES AND DIMENSIONS

Size (Nm)	Length (mm) (excludes adaptor)	Mass (g)
10	380.3	832
25	380.3	839
75	395.3	926
180	613.3	1494
340	788.3	1956
500	866.5	3500
750	1178.3	5360
Battery Pack		108.6



OVERVIEW – WRENCHSTAR MULTI

The WrenchStar Multi is a wireless production and quality audit wrench which works with the IQVu or TCI. There is a variant that works with a cable connected to the IQVu. In this case there is no battery pack or RF. The power comes from the IQVu and the Torque and Angle data are transmitted as digital signals along the cable to the IQVu.

The WrenchStar Multi reads the Torque and Angle values in real time and converts them to digital values. The WrenchStar Multi analyses the digital samples using measurement algorithms to calculate properties of the fastening such as Peak. The WrenchStar Multi communicates the final fastening readings to an IQVu using RF giving a range of approximately 10m*. If the WrenchStar Multi loses its link to the IQVu, then it continues to work offline, storing up to 200 readings. It is very easy to pair, (associate the connection), of a WrenchStar Multi with a particular IQVu.

The WrenchStar Multi contains its own power source which is a Lithium Ion battery pack.

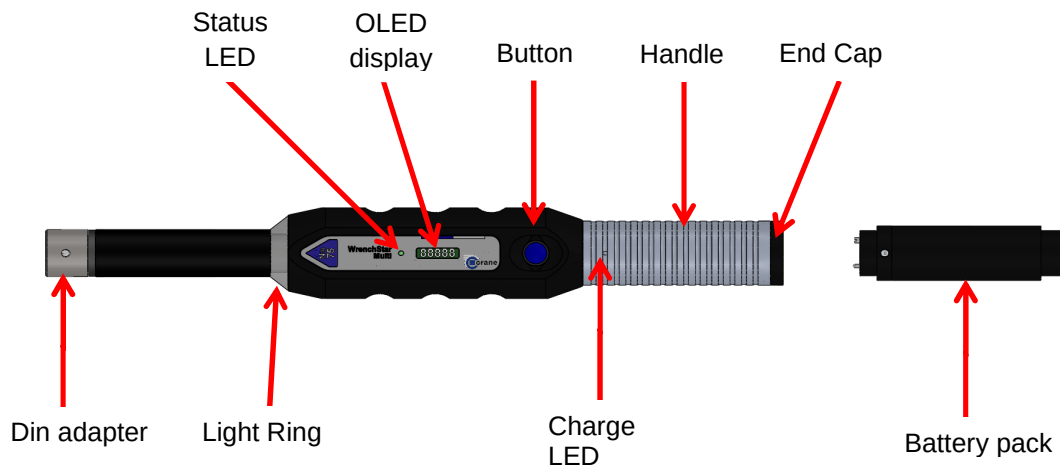
* The RF range depends on the environment in which the WrenchStar Multi and IQVu are being used and the figure quoted is for a relatively metal free work space with the IQVu in line of sight of the WrenchStar

Multi.

SPECIFICATIONS

Physical Measurement:	Bi-directional torque and angle, and pulse count	
Measurement Modes:	Peak Move On Yield	Capture of highest torque value during the cycle Capture of move on point torque during auditing of tightened joint. Special measurement algorithm for use with joints being taken into plastic region.
	The Wrench supplies its Torque Range (span), PPR (for angle), serial number, Calibration due date.	
Reading Storage:	The WrenchStar Multi can store up to 200 readings in offline mode.	
LEDs:	The WrenchStar Multi has a: Charge LED used when charging battery pack. Status LED Light ring for fastening status.	
Torque Measurement:	Resolution to 0.006% of transducer span Sampled every 60 micro-seconds (16,667) per second	
Zero Stability:	< 0.1% FSD / °C	
Static Accuracy:	+/-0.25% FSD	
Angle Measurement:	Sample every 1000 micro-seconds (1,000) per second	
Frequency Response:	A low pass Bessel Filter is employed for conditioning the transducer signal to 'eliminate noise' from the tool measurement Selectable from 75Hz to 4608Hz	
Readings:	Readings are organised into subgroups.	
Battery Pack:	Re-chargeable Lithium Ion battery. Capacity 2600mAh 3.7V Weight 108.6g Useable battery life of 10 hours with normal usage	
Communication:	Communicates with an IQVu using 2.400GHz RF	
Warranty:	1 year manufacturer's warranty	
Display:	OLED 32 x 128 pixels white	

MAIN FUNCTIONS AND FEATURES OF THE WRENCHSTAR MULTI



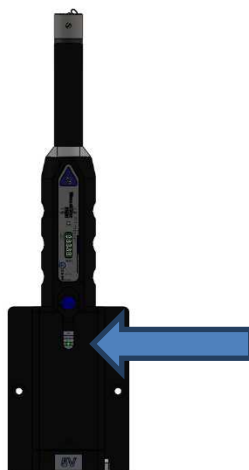
Serial number is on back.

BATTERIES

The WrenchStar Multi unit has a battery pack that contains a Lithium Ion battery. From fully discharged the unit will require up to a 4 hour charge to attain maximum capacity.

The full capacity of the battery is 2600mAh which yields approx. 10 hours of normal use.

When a WrenchStar Multi is placed in charging cradle, the charge indicator LED will illuminate with colour according to the charge status.



Charge Indicator LED Status

Red = Charging
Green = Charged
Off = no charging

WARNINGS



Maintain unit with care. Keep unit clean for better and safer performance.



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



Always operate WrenchStar Multi with approved battery pack.



Always operate, inspect and maintain this unit in accordance with all regulations (local, state, federal and country) that may apply.



Do not remove any labels.



Always use Personal Protective Equipment appropriate to the tool used and material worked.



Keep body stance balanced and firm. Do not overreach when operating with the tool. Anticipate and be alert for sudden changes in motion, reaction torque, or forces during the operation.



Ensure work pieces are secure. Use clamps or vices to hold work pieces whenever possible.



Never use a damaged or malfunctioning tool or accessory with this unit.



Follow instructions for changing accessories.



Do not operate this product in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.



This unit contains no user serviceable parts. Only qualified service personnel should replace or fit parts.

BATTERY WARNINGS



Charge the WrenchStar Multi before use.



Only charge the WrenchStar Multi in specified cradle.



Keep battery pack terminals clean.



Always store the battery pack in a dry place.



Do not short circuit the battery pack.



Do not disassemble the battery pack.



Do not expose the battery pack to high temperature.

CHARGING THE WRENCHSTAR MULTI

The wrench can be charged by inserting into the charging cradle.

Note: alternative charging methods may become available in the future.



The WrenchStar Multi will monitor its battery level. If the battery level goes below 10% the status LED will flash blue. If the status LED starts flashing it is recommended that the readings are immediately finished and the WrenchStar Multi taken back to the IQVu to upload any remaining readings. The WrenchStar Multi should be fully charged in a cradle before using. If the level goes to 0% the WrenchStar Multi will switch OFF.

Charger voltage is 5V.

WRENCHSTAR MULTI BUTTON

The WrenchStar Multi button has several functions:

- When the WrenchStar Multi is OFF pressing the button for less than 1s will turn the WrenchStar Multi ON.
- When the WrenchStar Multi is ON and the button is pressed for approx. 2s the WrenchStar Multi will go into pairing mode and the status LED will change to purple.
- If the WrenchStar Multi is in pairing mode pressing the button will take the WrenchStar Multi back to normal RF mode and the status LED will change to blue.
- If the WrenchStar Multi is ON and the button is held for more than 5s then the WrenchStar Multi will switch OFF.

The WrenchStar Multi will switch OFF after 10 minutes of no activity. It can be turned back ON with a press of the button. No activity means no torque messages from the IQVu and no torque pulled.

DIAGNOSTIC MODE

During switch ON if press blue button 3 x in quick succession it will go into Diagnostic Mode:-

The following information will be shown on the display. The number of taps is the number of taps on the blue button that will advance the display onto the next diagnostic function.

- Raw ADC from gauges 1 and 2.
1 Tap
 - Connected ADC
1 Tap
 - Zero offset
2 Tap
 - Gyro Type
2 Tap
 - Torque Track
2 Tap
 - Angle Track
2 Tap
 - Battery % level
2 Tap
 - Adapter ID and length
2 Tap
 - Testing on display
Status LED cycle Red, Green, Blue
2 Tap
 - Testing Light Ring cycle Red, Green, Amber
2 Tap
 - Testing
Light Ring cycle Red, Green, Amber
2 Tap
 - Testing
Vibrator turning on and off
2 Tap
 - Number of over torques and largest over torque
2 Tap
- ↓
Start

POWER ON SEQUENCE

The following information will be displayed when switch ON WrenchStar Multi:

- Crane logo
- s/w version 182-vx.x
161-vx.x
- Span in Nm
- Recal Date DD/MM/YY
- Battery level %

- WAIT if no job loaded. Else. Measure Mode (Peak, MoveOn, Yield)
- ↓
- Number of readings to go.

To turn OFF hold Blue Button until status LED turns off, then release the button.

To turn ON press Blue Button.

LIGHT RING

During and after fastening the light ring will indicate the primary parameter status, which will be torque except for Peak Angle Control, in which case it will be angle.

- Amber = LO
- Green = OK
- Red = HI

If the secondary parameter goes HI then light ring will go Red regardless of state of the primary parameter.

If MoveOn or Yield are not detected and torque was LO or OK then will get amber flash sequence (dash dot dot), otherwise if torque was HI then will get red flash sequence (dash dot dot).

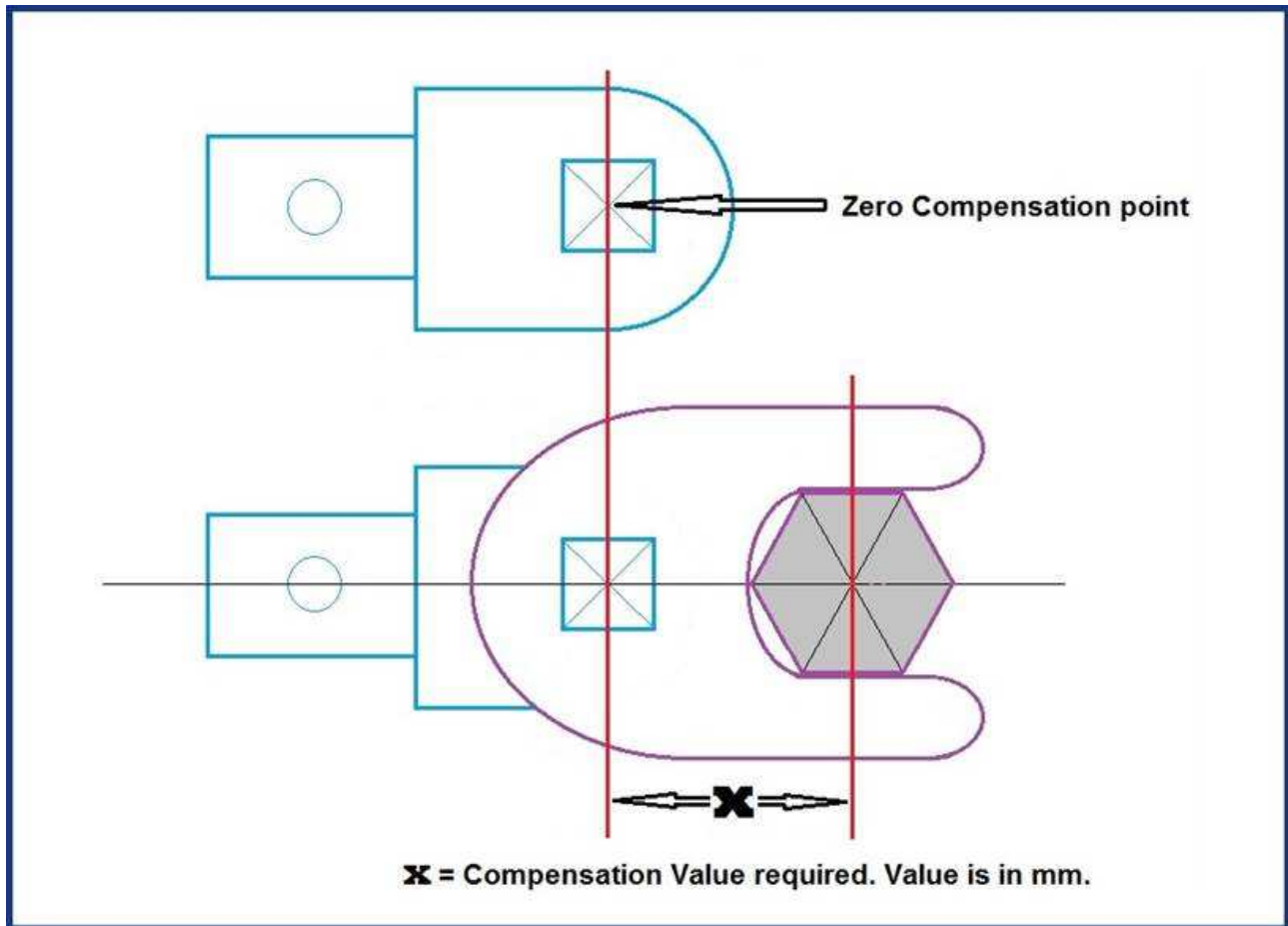
The light ring will start indicating the status as soon as torque goes above threshold.

When a new job is received the light ring will cycle twice through sequence amber, green, red to indicate job has been received and loaded. It will do the same when power up and the job is already loaded.

When a job is complete the light ring will continuously cycle through sequence amber, green, red until data is completely removed.

ID HEADS / ADAPTER LENGTH COMPENSATION

- The WrenchStar Multi will work with the Crane 1-Touch ID Head recognition system, the Crane 1-Touch system allows the wrench to compensate for special head designs that do not use the standard insert head dimensions.
- The Crane 1-Touch Heads can be programmed with an ID from 1 through to 126, if there is no ID then the WrenchStar Multi will not use the ID system and treat the head as a standard insert head, with a critical compensation length of Zero.
- The 1-Touch ID heads can be programmed with a compensation length, these lengths can be from 0 to 200 mm. When the wrench recognises that there is an ID Head present, it will automatically compensate the torque by the critical length programmed into the head.
- The 1-Touch ID Heads can be programmed up to 4 times, therefore if the compensation value needs to be updated, this can be done up to 3 times. This programming is done by Crane Electronics.
- Below is a diagram of how to calculate the critical length for an ID Head.



BATTERY CHARGE STATUS

Battery charge status will have 2 colours:

- Red = Charging
- Green = Charged
- No LED = No charging source present and running off battery power.

Battery Charge Status will be available even when the WrenchStar Multi is off. It will only be viewable when connected to a charging source.

WRENCH STATUS LED

- Black = Wrench powered Off
- Red = On and not paired
- Magenta (purple) = Ready to pair
- Blue = Paired and RF in range
- Amber = Paired, received job and not in range
- Green = Paired, received job and in range of receiver

Flashing between blue and yellow indicates low battery

VIBRATOR

The strong vibrator will be turned on when primary status becomes OK or either primary or secondary status becomes HI.

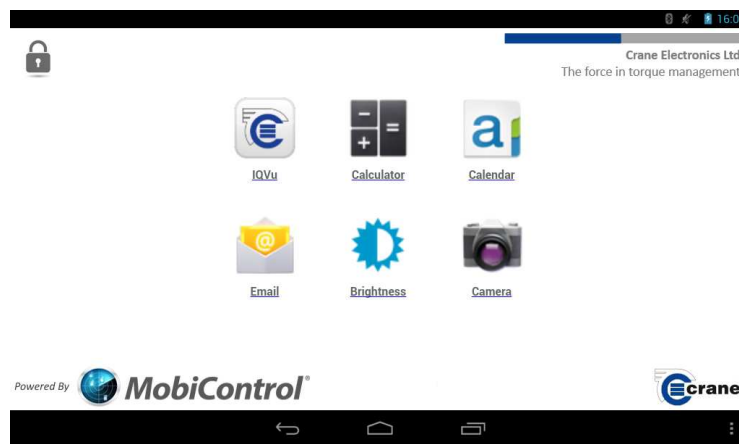
IQVu SETUP WITH A WRENCHSTAR MULTI

Before using an IQVu with the WrenchStar Multi make sure the WrenchStar Multi is charged.

Turn the IQVu on. Press and release the Power button on top of the IQVu.

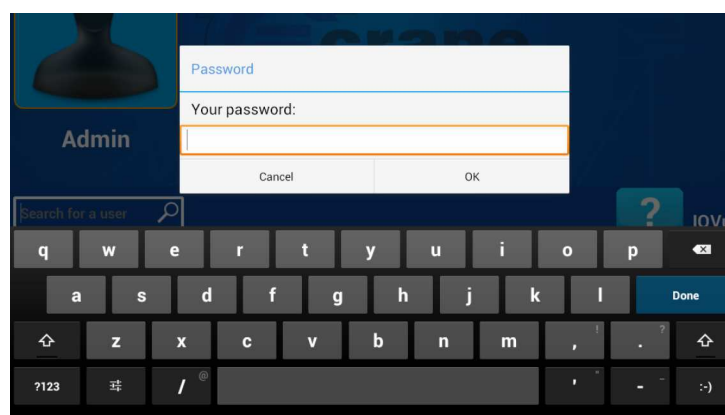


The IQVu is configured with SOTI software in order to provide the most secure environment.

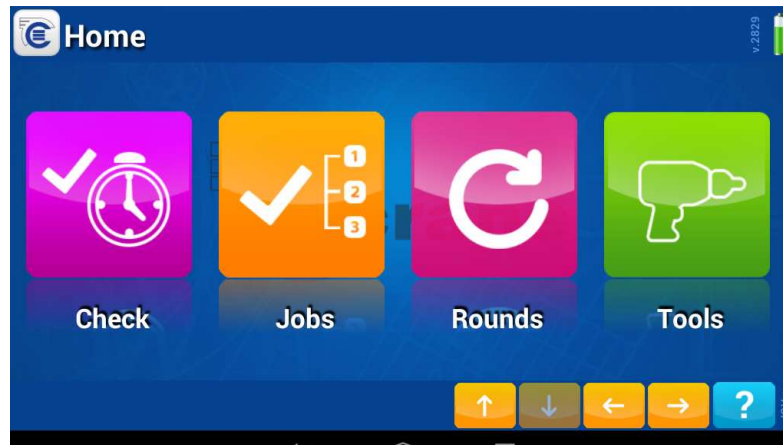


Select the Crane IQVu icon, the app will load and a Crane splash screen will be displayed before entering the login screen.

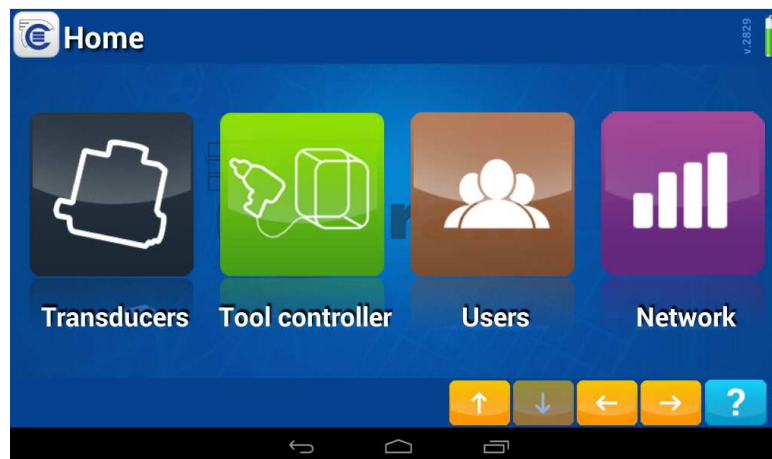
Select the relevant user icon and a virtual keypad will be displayed. Enter the password and click OK.



After logging in the user is taken to the Home Page menu.



To review more icons simply swipe across the screen and select 'settings'.



Use the right arrow to select 'Settings: 4/9 Connection'.



Select 'GET DATA'. Fields will be filled with default information.

Select the 'RF Address' field. Change the RF address to a unique one for that IQVu and enter a value between 0 and 65535. Do not keep the default address that appears.

Select 'Power' field'. The Power level can be 0 – 3 and affects the transmission range. If the Power level is set to 3 then the range will be at its maximum. If power level is set to 0 then the range will be at its shortest.

- 0 approx 1m
- 1 approx 4m
- 2 approx 7m
- 3 approx 10m

Select 'Channel'. Set the (frequency) channel between 0 and 79. Try and make this unique for each IQVu. If there is an interfering source then you can change the channel.

After editing select 'SET DATA'.

Select  on keypad to return to full screen.

When WrenchStar Multi are paired with the IQVu, they will be given the same RF Setup as the IQVu so they can all work together. Therefore if these settings are changed on the IQVu, then all previous pairings will stop working and a previously paired WrenchStar Multi would need to be re-paired with the IQVu.

****The IQVu should be re-booted after set up of a new RF address and channel. Press and hold power button. Select 'Power off' then 'Reboot****

Login and select 'Settings' following previous instructions.

Use the right arrow to go to 'Settings: 8/9 Readings'.

PAIRING THE WRENCHSTAR MULTI

Select Home  icon. Swipe across the screen and select 'Transducers'.



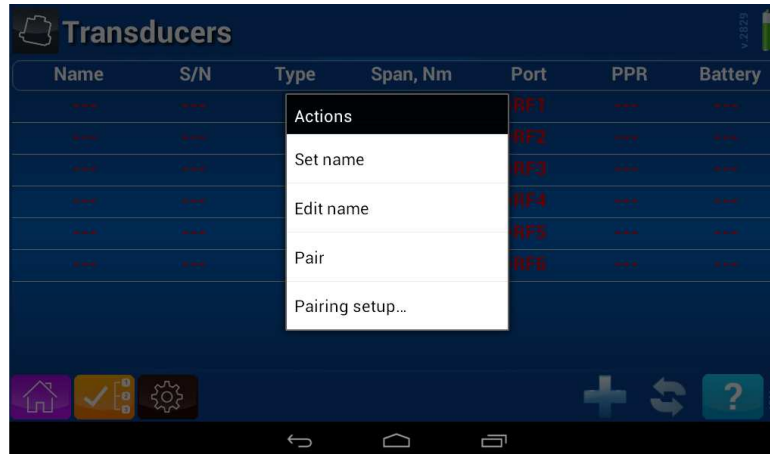
Name	S/N	Type	Span, Nm	Port	PPR	Battery
RF1	RF1	RF1	RF1	RF1	RF1	RF1
RF2	RF2	RF2	RF2	RF2	RF2	RF2
RF3	RF3	RF3	RF3	RF3	RF3	RF3
RF4	RF4	RF4	RF4	RF4	RF4	RF4
RF5	RF5	RF5	RF5	RF5	RF5	RF5
RF6	RF6	RF6	RF6	RF6	RF6	RF6

At this stage there is no WrenchStar Multi paired.

Switch on the WrenchStar Multi. Press Blue Button for less than 1s and the WrenchStar Multi will turn ON and the status LED will change to red.

Press button for approx. 2s until the status LED changes to purple. The WrenchStar Multi is now ready to be paired. Place the WrenchStar Multi close to within 30cm of the IQVu as the pairing process occurs over a short distance.

Select and hold one of the rows on the transducer screen, for example Row *RF1. An 'Actions' box will be displayed.



Select 'Pair' and, if the pairing is successful, within a few seconds you will see the following screen.



The WrenchStar Multi status LED will change from purple to blue. The WrenchStar Multi will now remember it's pairing even if it's turned off.

If pairing is not successful change the channel and repeat the pairing process.

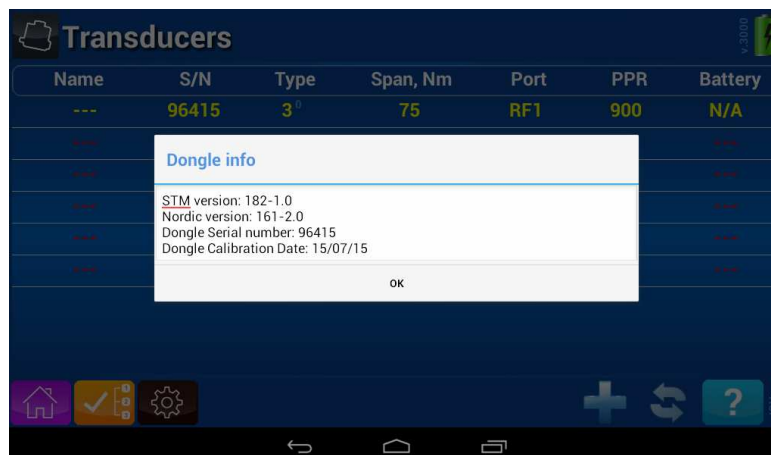
You will see a row of yellow information. It will give:

- The serial number of the WrenchStar Multi it's connected to.
- The Type '3' indicates it is a WrenchStar Multi.
- The span of the WrenchStar Multi which is used in jobs to see if the WrenchStar Multi is capable of performing a certain fastening specification./ or is used to confirm if the WrenchStar Multi is within the range of the fastening specification.
- Port – The IQVu in the future can potentially talk with up to 6 WrenchStar Multi simultaneously. At present only one RF WrenchStar Multi can communicate to the IQVu.
- PPR is from the attached transducer and is a statement of the angle resolution.

If you select the paired transducer the text will turn to green to show there is a connection. The battery level of the WrenchStar Multi will be displayed. If the battery level is below 10%, then you should immediately charge the battery in the WrenchStar Multi.



If you select 'Dongle info' from the 'Actions' box the following RF information will be displayed.



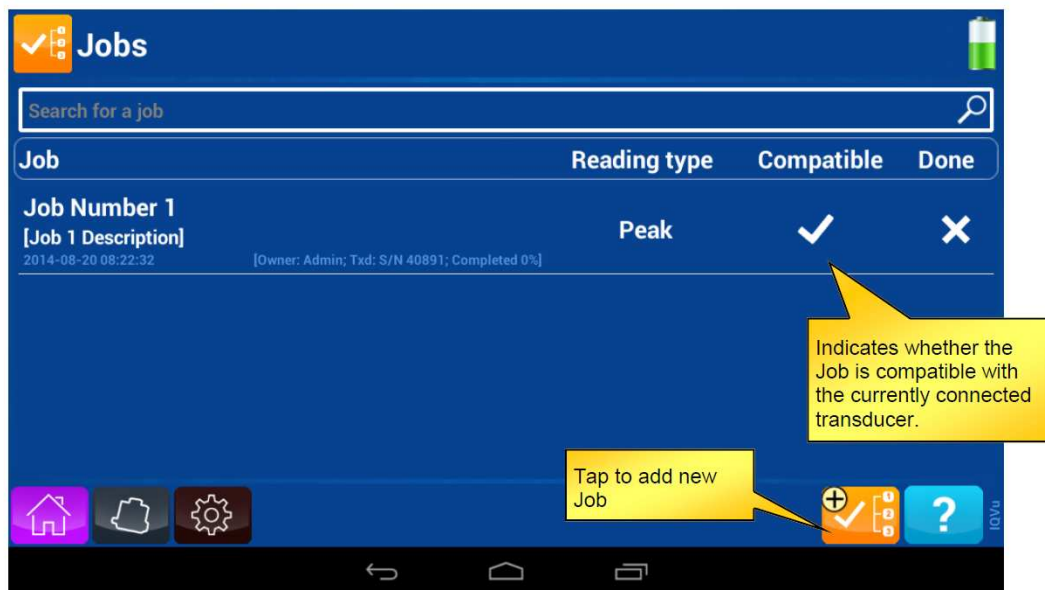
Select 'OK' to return to the 'Transducers' screen.

Select  icon.

LOADING JOBS

Once the WrenchStar Multi is paired and selected, you can enter a measurement screen either through 'Check' or 'Jobs' from the home screen. You can set up the measurement mode. At present the WrenchStar Multi supports Peak (plus angle), MoveOn and Yield.

To create a new Job select the "Add Job" icon in the bottom corner of the screen. The IQVu will prompt for a transducer selection, followed by requiring the user to select a measurement mode. With the mode selected swipe to the left or press the right arrow and configure the settings as required.



Select  to save Job.

When you enter the measurement screen, the job will be transferred to the WrenchStar Multi. The WrenchStar Multi can store one subgroup of one job and up to 200 readings for that subgroup.

When the job is transferred, the WrenchStar Multi light ring will flash amber, green then red twice.

At this stage you can start taking measurements with the WrenchStar Multi. It will tell you how many readings left. The WrenchStar Multi will locally measure the torque every 20 micro seconds and the angle every 1ms. It will analyse the measurement with the selected algorithm.

As the measurement is taken, the WrenchStar Multi light ring will show the status of the measurement. The

primary measurement (torque unless angle control) will display:

Yellow (amber) = Threshold < Value < LSL

Green = LSL < Value < USL

Red (user should stop pulling if they see Red) = USL < Value

If the Secondary value goes greater than its USL you will see a Red light on the WrenchStar Multi to warn the user to stop.

At the end of a measurement, until the next measurement starts, the WrenchStar Multi will display the primary measurement status for that joint.



In the case of a MoveOn or Yield not being found the Light Ring will flash (long flash followed by 2 short flashes) amber if the torque reading remains below the USL and flash red if the final torque reading is above the USL.

The WrenchStar Multi is constantly being polled by the IQVu for readings (every 0.5s). If the WrenchStar Multi goes out of range it can continue to take readings, which it will store. Once the WrenchStar Multi is in range of IQVu, the readings will be polled out of the WrenchStar Multi, oldest first.

If the WrenchStar Multi completes the subgroup of the job it will flash amber, green then red twice. When this happens you should take the WrenchStar Multi back to the IQVu so any remaining readings can be uploaded. If required, you can then download the next subgroup.

IQVu check is assumed to be a job subgroup with 200 readings.

The IQVu will show the readings it gathers from the WrenchStar Multi in the standard way. The readings will have their status colour coded as usual. The reading count will show how many readings have been retrieved.

Note: - no traces are stored or can be retrieved from the WrenchStar Multi.

The following screens show examples of readings gathered by IQVu from the WrenchStar Multi using different measurement modes:

Peak plus Angle



MoveOn



Yield

