



IQVu

Manual 1198-01 Issue 3

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 IQVu 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 A 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 commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



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.

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 IQVu fitted with a Torque Interface Module.

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.

CONTENTS

CE Marking / Product Disposal	2,3	Job Mode Perform Measurement /	
About this manual	3	View statistics	42,43
Contents	4	Round Mode	44,45
Packing List	5	Printing	46
Care & Storage	5	Network	47,48
Batteries	5	Email	49
Warnings	6	Settings	50,51,52,53,54,55
Overview – IQVu	7	Appendix A	
Features and Dimensions	8	User privileges	56
Specifications	9,10,11	Appendix B	
Controls and Connections	12,13	Round order	57
Battery Charging	14	Appendix C	
Connecting to PC	14	Help	58
Connecting a transducer	15	Appendix D	
Switching ON	16	App screen flow chart	59
Switching OFF	16	Appendix E	
Reset	16	Colour reference chart	60
IQVu Navigation	17	Appendix F	
Unlocking a settings Screen	18	Calculations	61,62
Alpha / Numeric Entry	18	Appendix G	
Selecting from a list	18	Glossary of terms	63,64
Start up Screen	19		
Language	20		
Logging in	21		
Home Menu	22		
Users	23		
Transducers	24		
Check Mode	25		
Editing Check Mode Settings	26,27		
Performing a check Measurement	28		
Check Mode View Readings / Add			
Attachment	29,30,31,32,33		
Check Mode View Readings /			
Rundown Trace	34		
Check Mode View Statistics	35		
Check Mode Save to Job	36		
Job Mode	37,38,39,40		
Job Mode Perform Measurement	41		



PACKING LIST

The following items are supplied with the IQVu package.

1 x IQVu Unit	1 x IQVu Torque Module
1 x User Manual (CD)	1 x GETAC handle accessory
1 x Quick start guide	1 x PSU and country specific plugs
1 x Stylus	2 x spare stylus tips
1 x Wrist Lanyard	1 x Carry Case
1 x Tether	

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

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).

Tablet is MIL-STD-810G and IP65 certified.

The main screen may be wiped clean with a soft cloth.

BATTERIES

The IQVu unit has an internal Lithium Polymer pack.
From fully discharged, the unit will require a 6 hour charge to attain maximum capacity.

The full capacity of the battery pack is 7600mAh which yields approx. 8 hours (1 average shift) of normal use.

When the PSU is plugged into the socket and switched on at the mains, the charge indicator LED will illuminate with colour according to the charge status.

- Glow red = battery power is critically low (less than 10%)
- Glow amber = battery charging in progress
- Glow green = battery fully charged
- Flashes amber = current battery level is insufficient for starting up the device
- Flashes red and amber = battery is in an abnormal state (contact Crane for assistance)



The IQVu can be used while charging (subject to emperature constraints.)



WARNINGS



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



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



Always operate IQVu with approved power supply



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 this 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.



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



OVERVIEW

IQvu is the most revolutionary torque data collector in the world. It combines all of the features of the established TorqueStar with a market leading, robust Tablet to give a modern and familiar product. It provides the ideal Solution for the measurement and collection of torque, angle, and pulse data in the manufacturing and quality environment.

The Tablet is sleek, thin, but tough, certified to a MIL-STD810G six foot drop rating along with IP65 dust and water protection.

It has been carefully engineered, down to the chassis, to be protected against drops, shocks, spills, vibration and more.

The screen of the IQVu uses Tempered Glass and features LumiBond™ optical bonding. This results in a display that is not only extremely robust and scratch resistant, but also very durable and easy to read in most lighting conditions.

By using ultra-sensitive multi-touch technology the screen has been developed to respond effortlessly to touch, press, drag - even from an input from a gloved hand.

The comprehensive audit tool performs bi-directional measurement in track, peak, click, pulse, move on and yield measurement modes.

The quick "Check" function allows the operator to take measurements as required.

Work can be scheduled using Rounds and Jobs to allow a planned approach to collecting any data.

Input of any information is either via the soft keypad on the screen or downloaded from OMS or Opta Comms.

The IQVu works with existing Crane products and all new Crane products, including the increasing range of Crane wireless devices, allowing further flexibility when collecting data.

The high resolution 7" screen clearly displays all relevant information, using colour to enable the operator to easily view and interpret the information.

Throughout the measurement process relevant measurement values are displayed along with a realtime graph of the tightening trace if required.

Measurement readings and associated information are stored on the IQVu. In addition detailed individual readings of traces are stored. All of this information can then be saved to a USB stick or emailed directly from the device.

PDFs of documents, work instructions, photographs, and comments can be loaded onto the IQVu and stored against Jobs. As well as being loaded from a USB stick, photographs can also be taken using the 5 mega pixel auto focus camera built into the IQVu.

This enables the operator to take photographs of applications to store against relevant readings, if required for later analysis.



FEATURES AND DIMENSIONS

WEIGHT

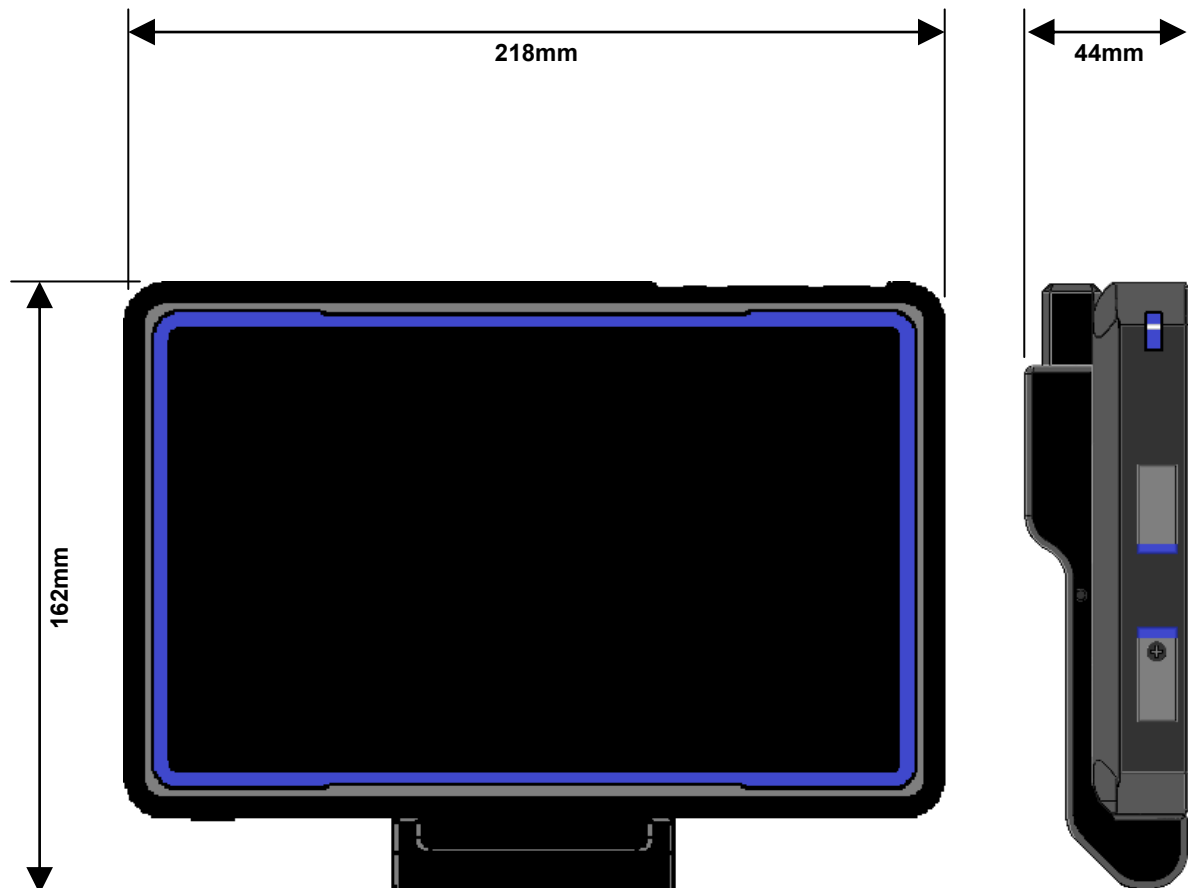
Complete with Torque Module and hand strap - 1.04Kg

CONSTRUCTION

Protective rubberised trim and soft engineering material, with rounded corners to alleviate damage to goods being tested. Tablet will survive 1.8m drop

DIMENSIONS

218mm (W) x 162mm (L) x 44mm (H)





SPECIFICATIONS

Physical measurements:	Bi-directional torque and angle*; pulse count, pulse rate; RPM** * Angle measurement is only available when using a rotary transducer with angle encoder. **RPM is only available when using a rotary transducer with angle encoder in Track Mode	
Measurement units:	Nm, Ncm, lb ft, lb in, oz in, kNm, klb ft, kg m, kg cm	
Measurement modes:	Track	real time torque
	Peak	capture of highest torque value during the cycle.
	Click	capture of peak torque before click mechanism operates to limit.
	Pulse	special measurement algorithm for use with impulse tools, incorporating pulse count and pulse rate.
	MoveOn	special audit algorithm that detects the torque at the point where already fastened joint starts to turn.
	Yield	special production algorithm that detects the torque at the point where fastener starts to stretch.
Plug & Play txd data:	The following information is read from memory incorporated in the UTA transducer or CheckStar Multi: Torque range (span), angle encoder PPR, Transducer serial number, Calibration due date. In addition the Torque@2mV/V will be read from the CheckStar Multi.	
Types of Transducer:	CheckStar Multi (Rotary IS plug and play) UTA (Rotary, Static, and Wrenchmaster) automatically work. Industrial Standard (can be manually pre-set).	
Data Storage:	16Gbyte storage Micro SDHC (up to 32GBytes) slot.	
Processor:	1GHz Dual Core Processor	
Operating System:	Android 4.1	
Statistics:	Statistics for primary measurement: Count of readings Cp Mean (average) Cpk Standard Deviation (sigma) Cm Range (max-min) Cmk	
Print:	Wi-Fi printer (TBC)	
Display:	7.0" TFT LCD WSVGA Resolution 1024 x 600 pixels Brightness is adjustable Touch sensitive with gloves worn. Special damage resistant tempered glass, which is both tough and scratch resistant.	
Fastening Status:	Colour (user definable) Sound (user definable) Vibration (user definable) External Light ring indication on CheckStar Multi (User definable for specification and control limits.) Graph of Tightening Trace: Available in real time. Resolution down to 1mS. Can zoom in to see features. Can display torque vs time (default), and angle versus time, and torque versus angle if angle transducer used.	



SPECIFICATIONS CONTINUED

Data Entry:	Numeric and Alphanumeric Via soft keypad on screen. Actions by moving finger, tapping screen, tapping icons and soft buttons on screen. User interface is via graphical icons that are language independent.
Operating Language:	English, French, German, Spanish, Italian, Chinese and Swedish . Can toggle between languages when log in.
Txd Calibration Date:	Warned if transducer out of calibration.
Torque Measurement:	5 digit display Resolution to 0.006% of transducer span. Sampled every 20 micro seconds (50,000 per second).
Zero Stability:	< 0.1% FSD / °C
Static Accuracy:	+/-0.2% FSD of connected transducer.
Angle Measurement:	Display angle to 0.01 degrees. Sample every 1000 micro seconds (1,000 per second). Automatically adapts to PPR of angle transducer using quadrature phase measurement.
Security:	App protected by SOTI MobiControl, which limits which apps can be accessed by the user. Multiple users are supported with User login with password and individual level of access.
Frequency Response:	A low pass Bessel Filter is employed for conditioning the transducer signal to eliminate 'noise' from the tool measurement. User selectable from 75Hz to 5000Hz.
Power:	International Charger 12V @ 2 A from 100-240VAC; 50/60Hz 6 hours to fully charge batteries.
Batteries:	Internal Lithium Polymer battery pack. Capacity 7600mAh Useable battery life 8 hour shift with normal usage.
Stand:	Can lie flat or be angled on desk for ease of viewing with built in stand.
Carrying:	Can be held in either hand and comes with hand and wrist straps.
Power Management:	Selectable time for going to sleep and dimming the screen to save power.
Ports:	25 pin female D-type for connecting to transducers. DC Power port for running off mains and charging batteries. USB port to accept connection to PC or USB memory stick. SD card slot.
Communications:	USB ver 2.0 (host and client) Bluetooth (v2.1+EDR class 2) WLAN 802.11 b/g/n
Camera:	5 Mega pixels auto focus camera. Photos can be attached to job or individual readings.
GPS:	GPS position can be associated with reading.
Time:	Realtime clock. Date and Time stamp for each reading.

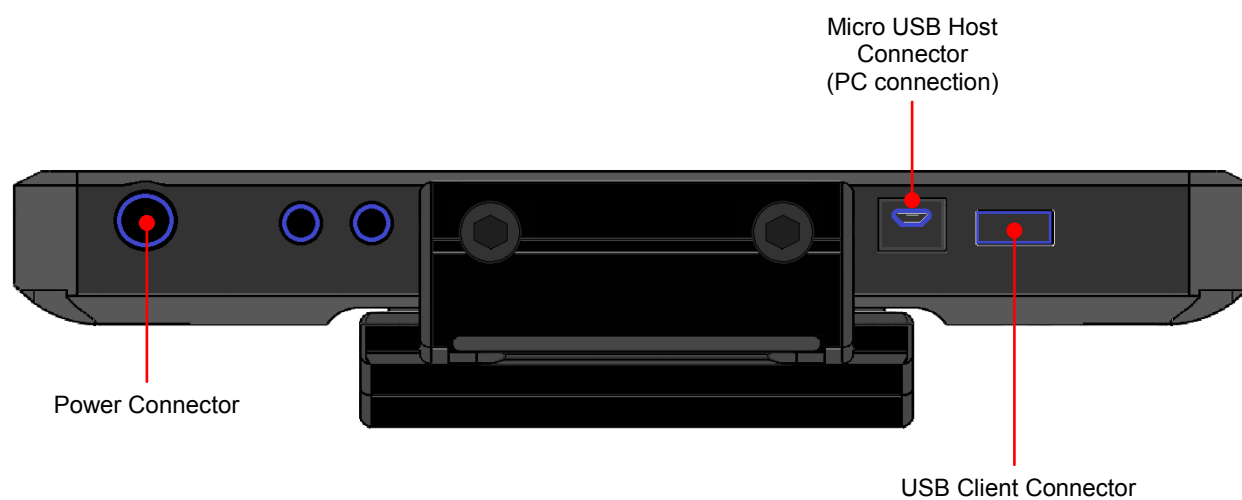
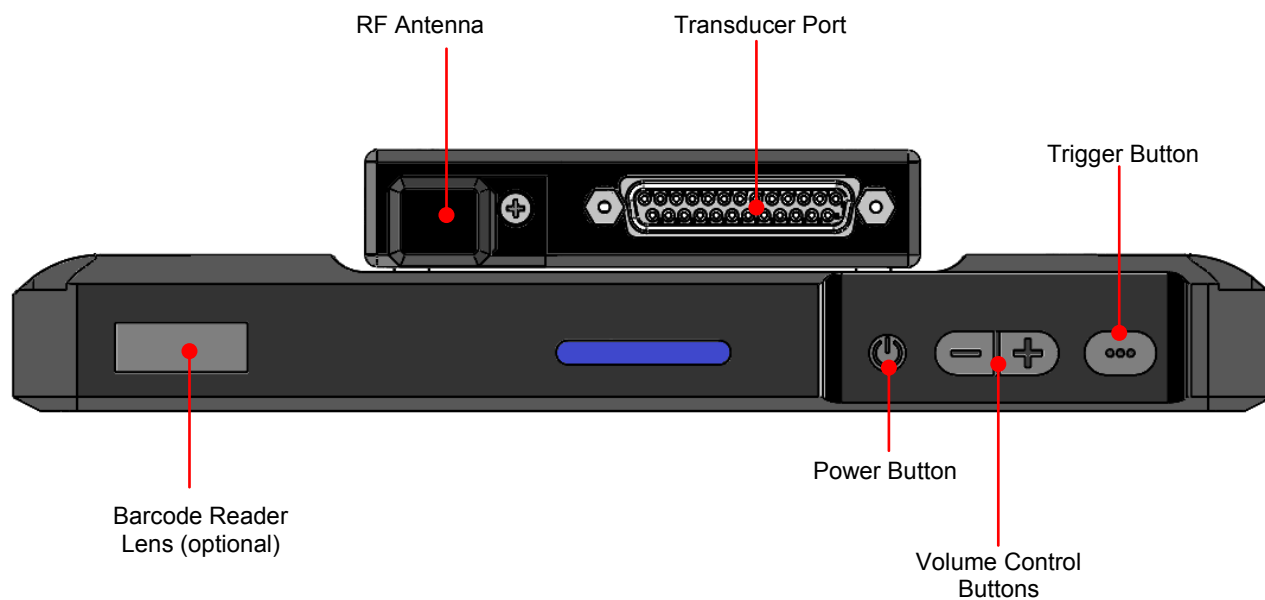


SPECIFICATIONS CONTINUED

Barcode:	Optional Reader available.
Warranty:	TBC
Work Instructions:	Work instructions in form of jpg image or pdf file can be associated with job.
Readings:	Readings can be organised into subgroups, jobs and rounds. A trace of the fastening can be associated with all readings or just those that are NOK. Readings and Traces are stored and can be viewed later
Job specifications:	Jobs be specified for specific, similar or any transducer. Control limits are possible.
DC Tool connection:	The IQVu can talk to DC Tool Controller using Open Protocol over Wifi and associate the tool reading with a reading from transducer.
Export:	Torque Readings can be exported as CSV file so can be used in Excel template to generate user reports
PC Compatibility:	Will communicate with OMS and Opta Comms.

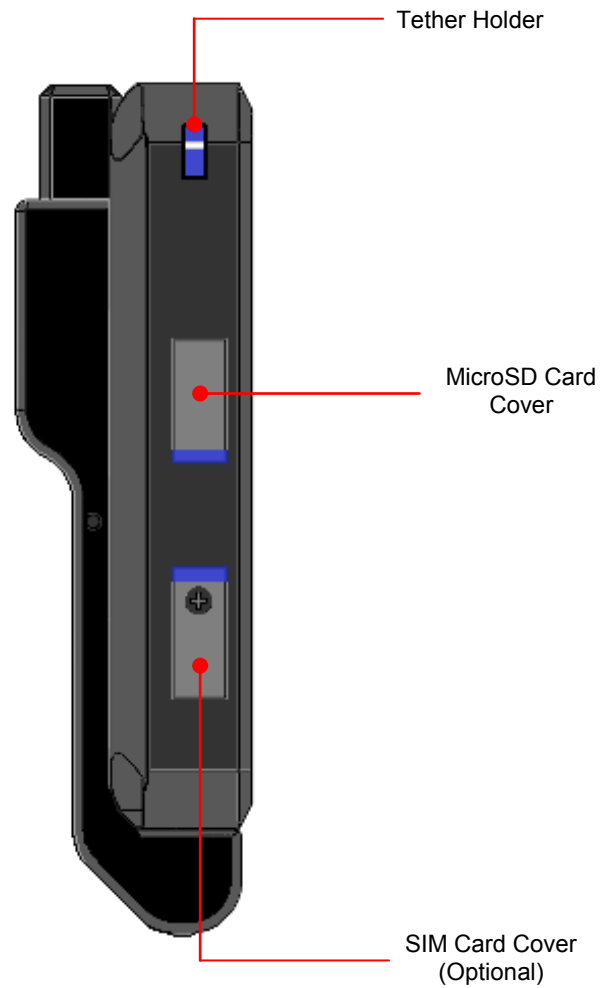


CONTROLS AND CONNECTIONS





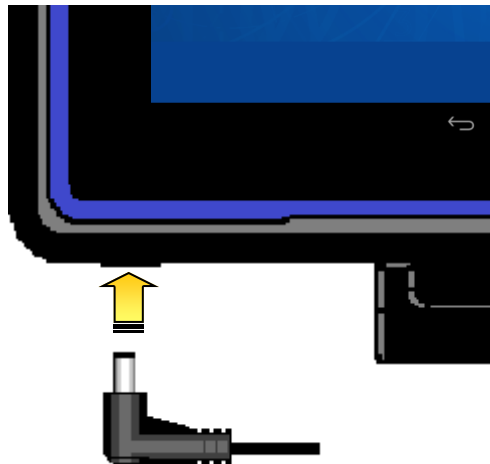
CONTROLS AND CONNECTIONS CONTINUED





CONNECTING CHARGER

Connect the lead from the PSU to the connector on the bottom of the IQVu (see below), and connect the PSU to an AC mains supply. The adaptor can be used for direct power from the mains or to charge the internal battery. It has an auto-matic cut-off to prevent overcharging.



CAUTION : To ensure optimal performance from the battery use only included AC PSU. Do not charge the battery when the temperature is at extremes (i.e. $>40\text{ deg C}$ {104 deg F} OR $< 0\text{ deg C}$ {32 deg F}). If the IQVu is not used for a long period of time, ensure the battery is charged at least once every 2 weeks. Over discharge can adversely effect performance.



TIP Whilst charging, the bottom right corner of the IQVu display may become warm. This is within normal operating parameters and is not harmful to the device.

CONNECTING TO PC

Ensure suitable PC software and drivers are installed before connecting IQVu

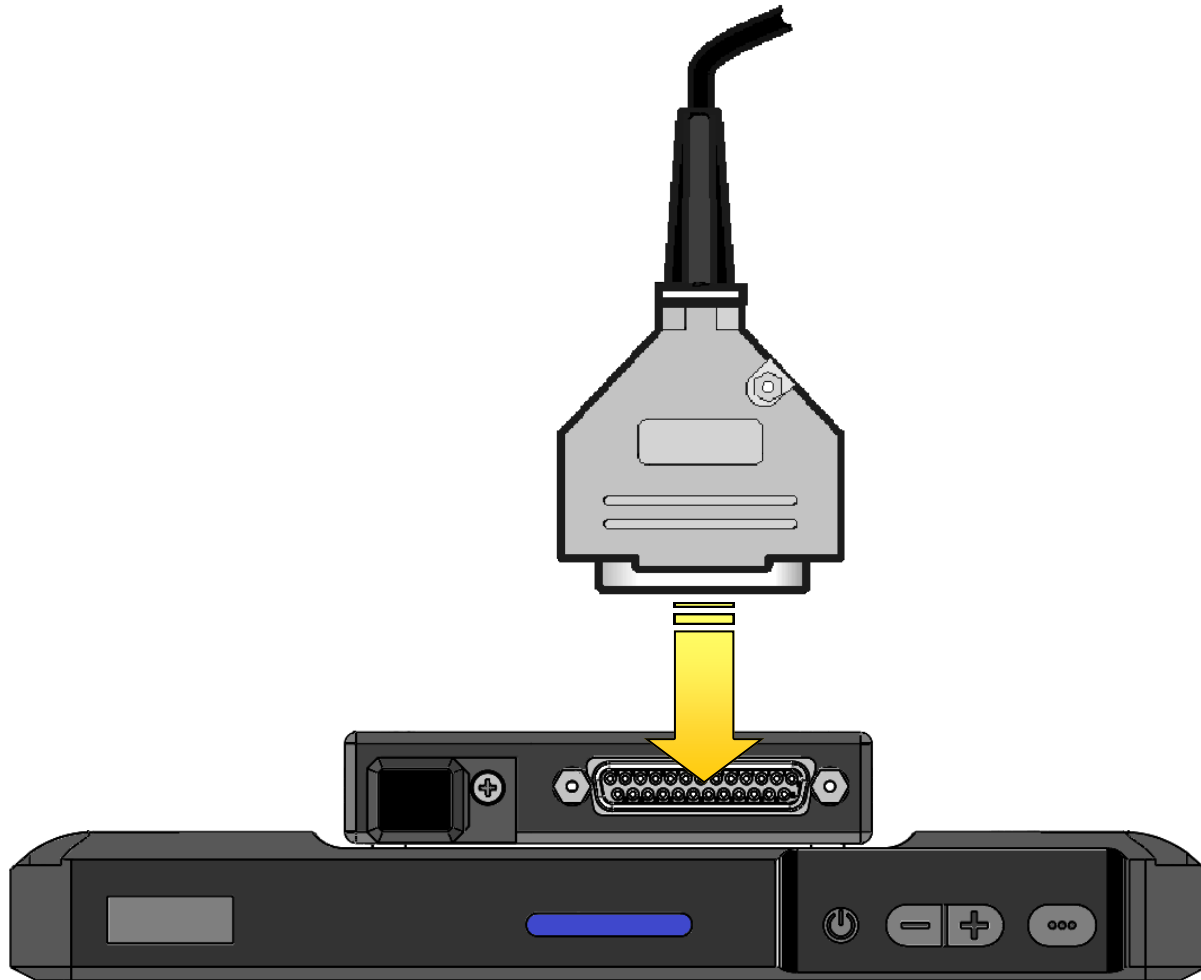
Connect the Micro USB cable to the Micro USB Host connector, then connect to USB socket on PC.

Refer to PC software manual for further information.



CONNECTING A TRANSDUCER

Connect a suitable transducer to the IQVu via the 25-way 'D' connector on the rear of the IQVu as shown below.

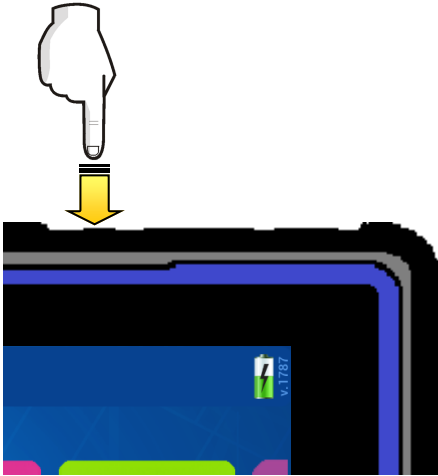


NOTE: To connect multiple transducers to the IQVu, an optional automatic switch box is available. For more information please contact your local representative.



SWITCHING ON

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

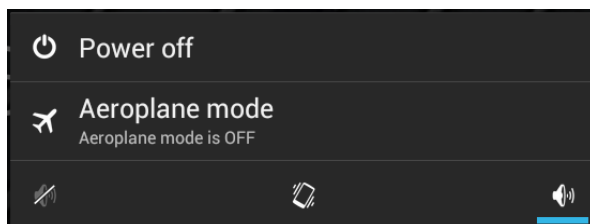


The IQVu will take approx 30 seconds from a cold start as the Android OS loads.

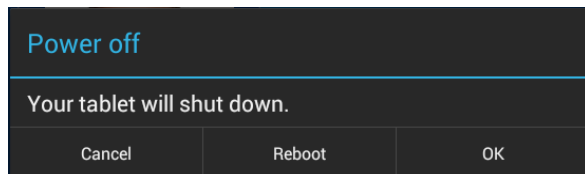
If the IQVu is just in display sleep mode it will turn on immediately

SWITCHING OFF

Press and hold the power button on top of the IQVu until a menu pops up on the screen.



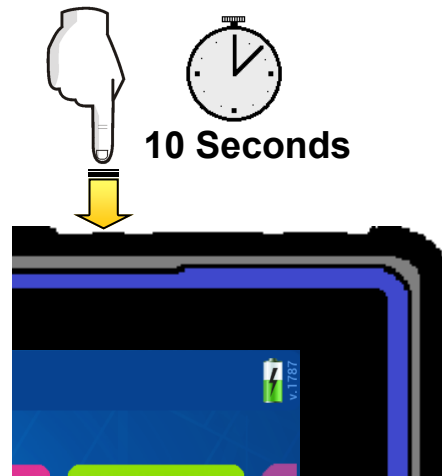
Select the "Power off" option
Then select "OK"



RESET

If the IQVu becomes un-responsive it can be powered down by pressing and holding the power button for longer than 10 seconds.

This will NOT Erase any stored data



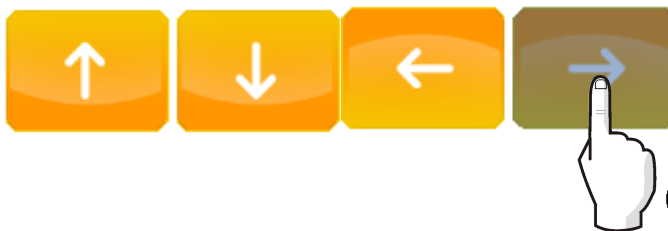


IQVU NAVIGATION

To Navigate the IQVu menu simply swipe left / right or up / down for more options



Or where applicable use the arrow icons on screen



TIP Tap and hold arrow icon to fast scroll through settings pages.



CAUTION : Do not use sharp objects on the touch screen. Doing so may damage the display surface. Always use the included stylus or your finger.

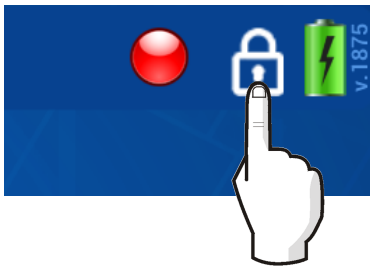


IQVU NAVIGATION CONTINUED

The IQVu has 3 data entry methods - Numeric, Alpha Numeric entry and selecting from a list.
Before editing a field the screen must be unlocked.

UNLOCK A SETTINGS SCREEN

To remove the edit lock simply tap on the padlock symbol in the top right of the screen



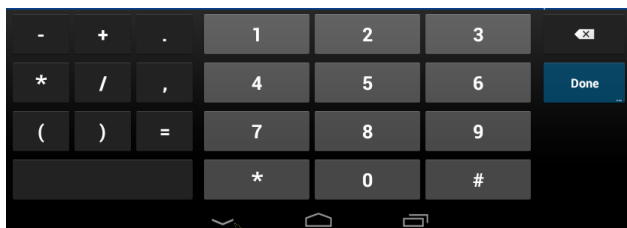
Tap again to reinstate the lock



TIP Navigation away from the current screen is disabled until the edit lock is reinstated

NUMERIC ENTRY

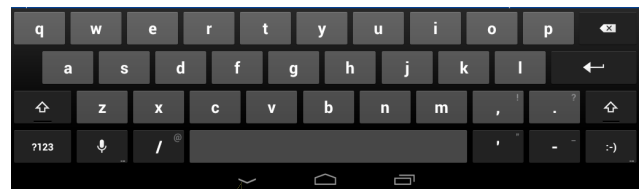
Tap on the numeric field to be edited and the IQVu will automatically display a virtual numeric keypad.
Tap "Done" to accept the value and the keypad will automatically disappear.



Tap here to close the keypad

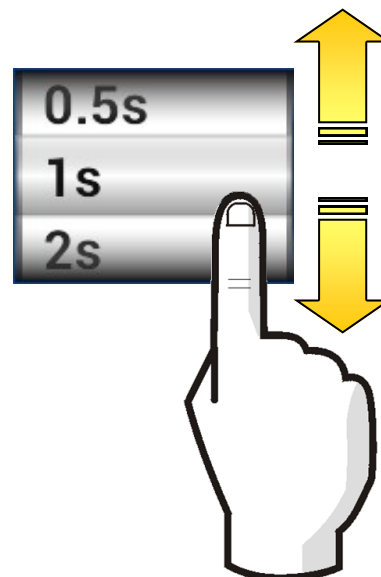
ALPHA NUMERIC ENTRY

Tap on the alpha-numeric field to be edited and the IQVu will automatically display a virtual keypad.
Tap "Done" to accept the value and the keypad will automatically disappear.



Tap here to close the keypad

SELECTING FROM A LIST



Tap and hold on the cylinder then swipe up / down to change the value. The required value should be in the center position



STARTING IQVU APP

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



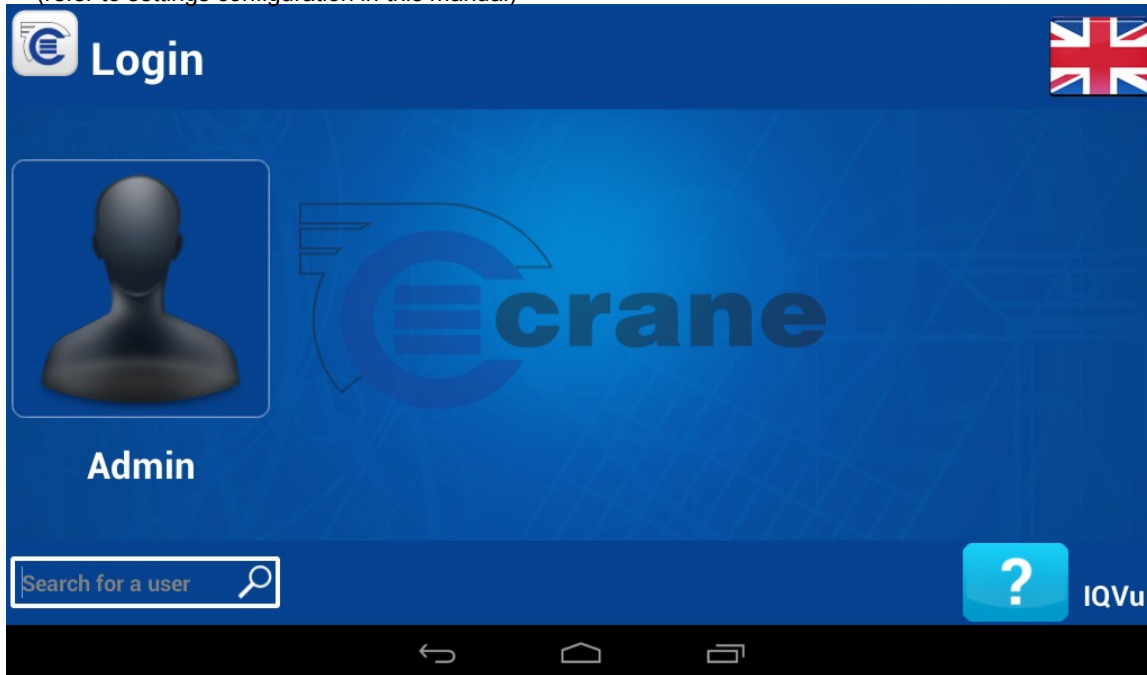
Select the Crane IQVu icon, the app will load and a Crane splash screen will be displayed before entering the login screen. When the IQVu first starts it will display the SOTI menu which contains all approved apps that are allowed to run on IQVu.





LANGUAGE

It is possible to change the language for the IQVu directly from the login screen or within the settings menu (refer to settings configuration in this manual)



To change the language simply tap on the flag icon in the top right of the screen. Swipe up/down on the flags to reveal more options.



English



Chinese



French



Spanish



German

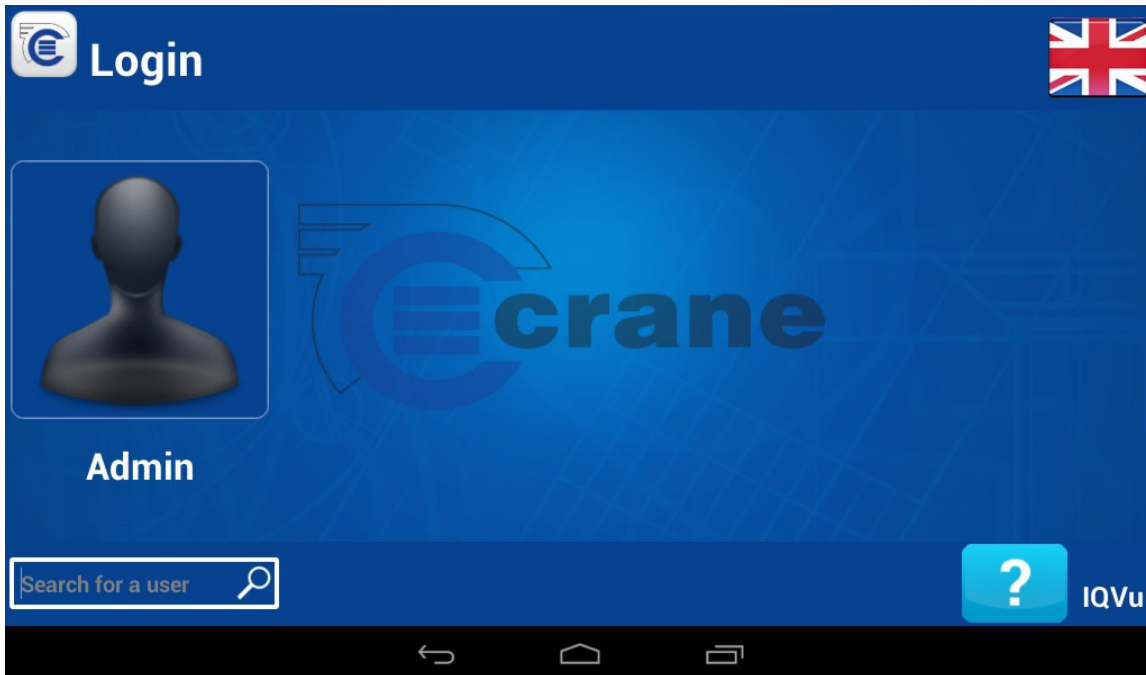


Italian

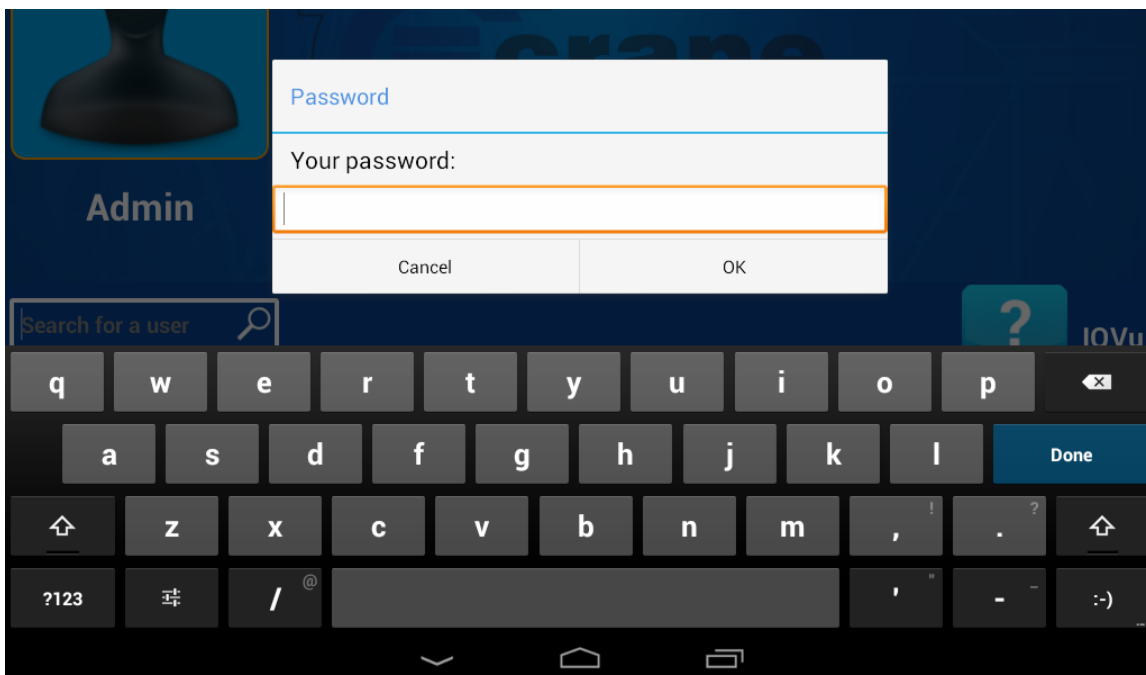


LOGGING IN

The IQVu is pre-configured with an Admin user which has a default password = "admin"



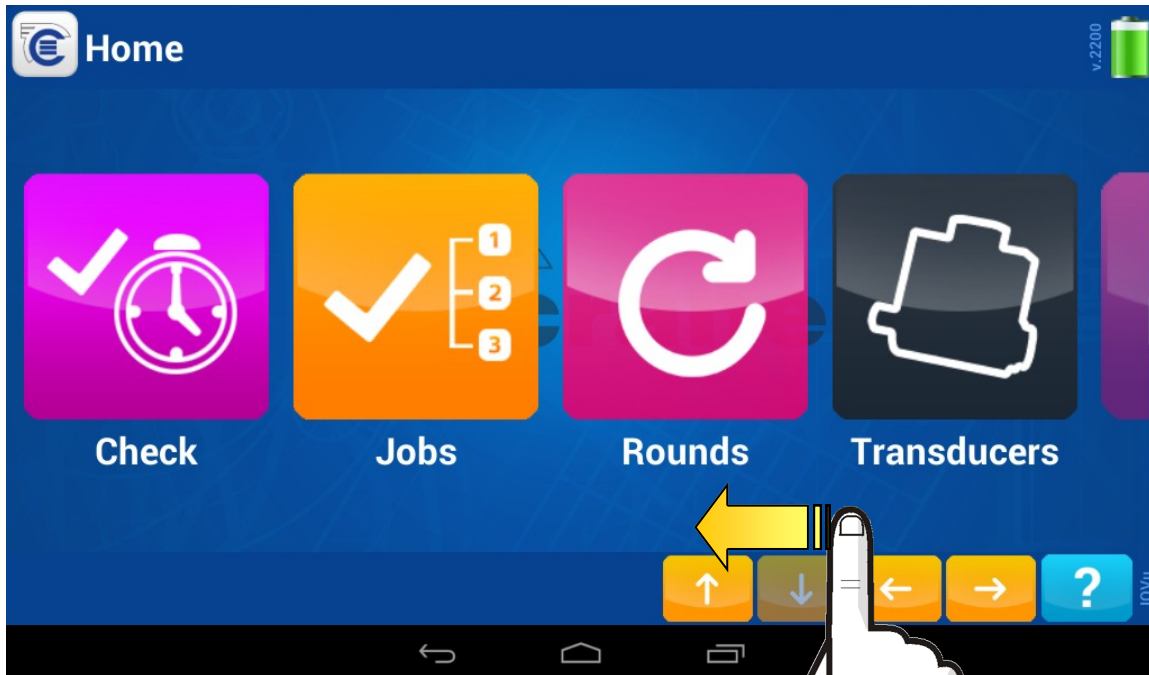
To enter the password simply click on the Admin user icon and a virtual keypad will be displayed. It is recommended that this password be changed before continuing further work on the IQVu.



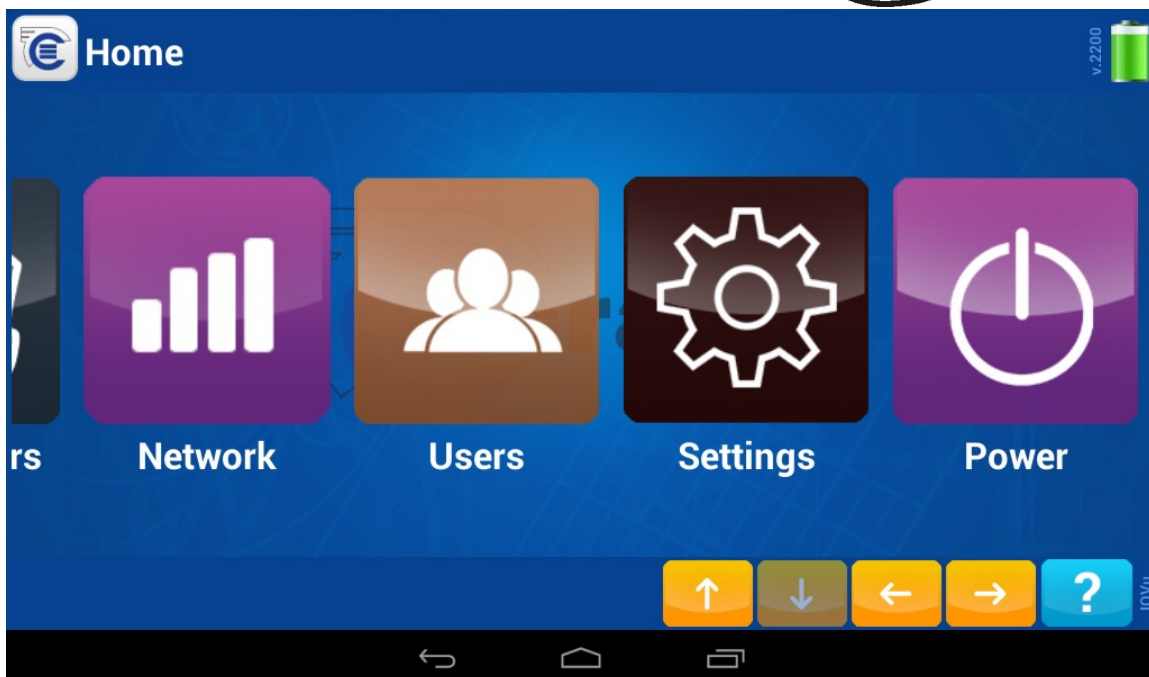


HOME MENU

After logging in the user is taken to the home page menu.



To review more icons simply swipe across the screen.





USERS

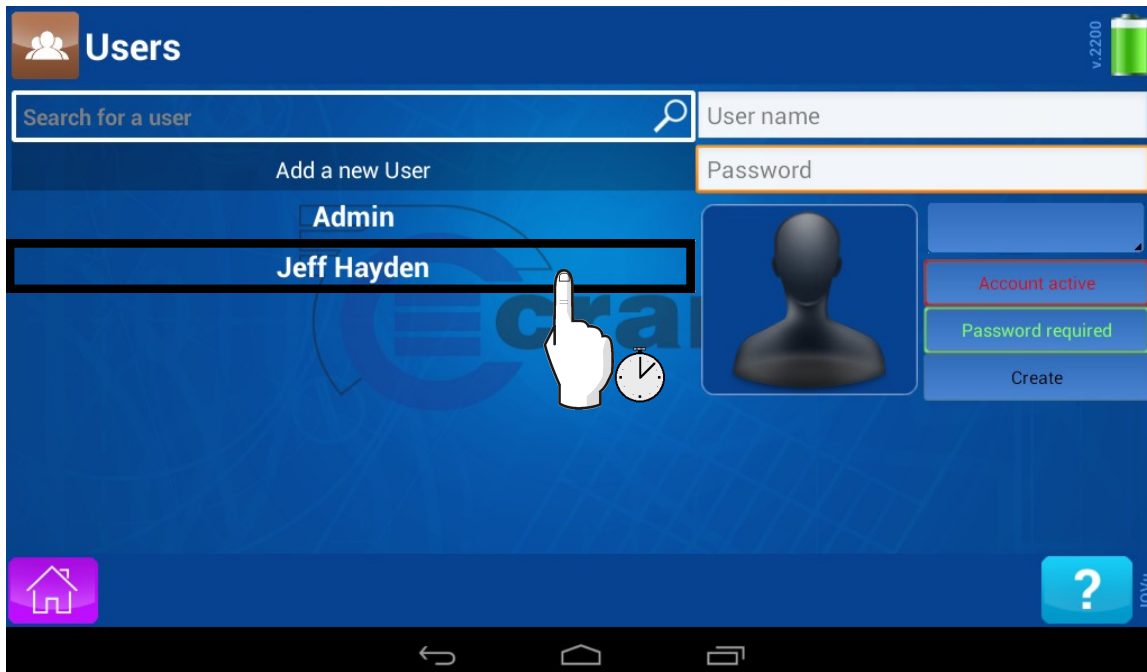
To manage user on the IQVu select the User icon from the home menu.



Enter information into all fields then click “Create” to add the new user to the list.

For more information on user type please see table in appendix A.

A user can be removed from the login menu without deleting the profile by tapping the “Account Active” button



TIP Tap and hold user name until box appears around it. User can then be placed in the order required on The list / login page by dragging up / down.



TRANSDUCERS

IQVu is compatible with Checkstar Multi, UTA and IS transducers. Multiple transducers can be attached via The optional Automatic Switch Box.

Name	S/N	Type	Span, Nm	Port	PPR	Battery
75Nm T&A	77307	0	75	2	180	N/A
75Nm T&A	86635	0	75	3	720	N/A
180Nm T&A	91296	0	180	4	180	N/A
10Nm T Only	100	0	10	5	180	N/A
---	---	---	---	+RF1	---	---
---	---	---	---	+RF2	---	---
---	---	---	---	+RF3	---	---

Connected transducers are colour coded.
“Plug and Play” transducer will automatically appear in the List when the refresh icon is tapped.

GREEN = Available AND selected
AMBER = Available NOT selected
RED = NOT available

Create

S/N	12345	mV/V	2
Span, Nm	75	Torque@ mV/V	74.98
PPR	720	Close	OK



When using the optional automatic switch box, IS transducers can ONLY be in port 1



CHECK MODE

When entering check mode, then IQVu will prompt to select a transducer to use. Simply tap on the required line.

Name	S/N	Type	Span, Nm	Port	PPR	Battery
---	40891	0 ⁰	180	1	180	N/A
---	---	---	---	*RF1	---	---
---	---	---	---	*RF2	---	---
---	---	---	---	*RF3	---	---
---	---	---	---	*RF4	---	---
---	---	---	---	*RF5	---	---
---	---	---	---	*RF6	---	---
---	12345	(IS) 6 ^{74.98} ₂	75	1	720	N/A



RF 1 through 6 are reserved for future use.

Check

0.00Nm

0.00°

Txd: 40891-180

Torque & Time

Tap on the measurement icons to change mode Peak, Click, Pulse, Move-on, Yield and Track



EDITING CHECK MODE SETTINGS

To enter check mode settings simply swipe to the left across the screen

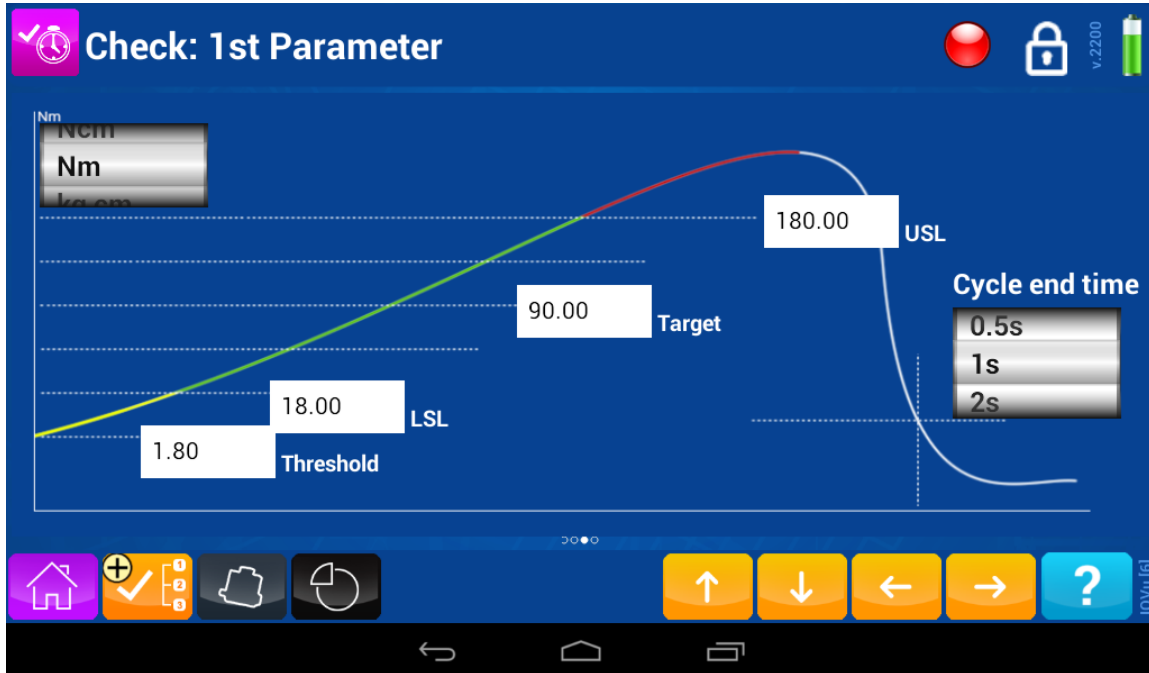


Unlock the screen and make required changes.



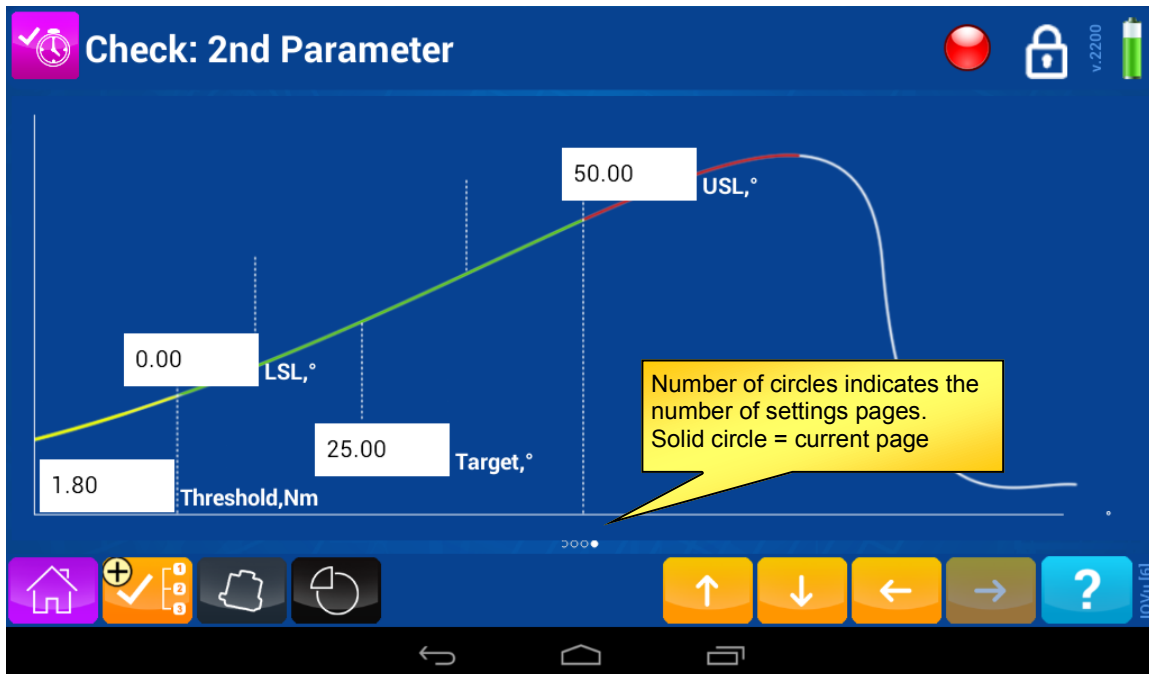
EDITING CHECK MODE SETTINGS CONTINUED

Swipe to the left again to show 1st parameter setup as below:



TIP Padlock needs to be opened before editing is allowed. Please refer to IQVu navigation in this manual for further details.

If a second parameter is defined left swipe again to show parameters

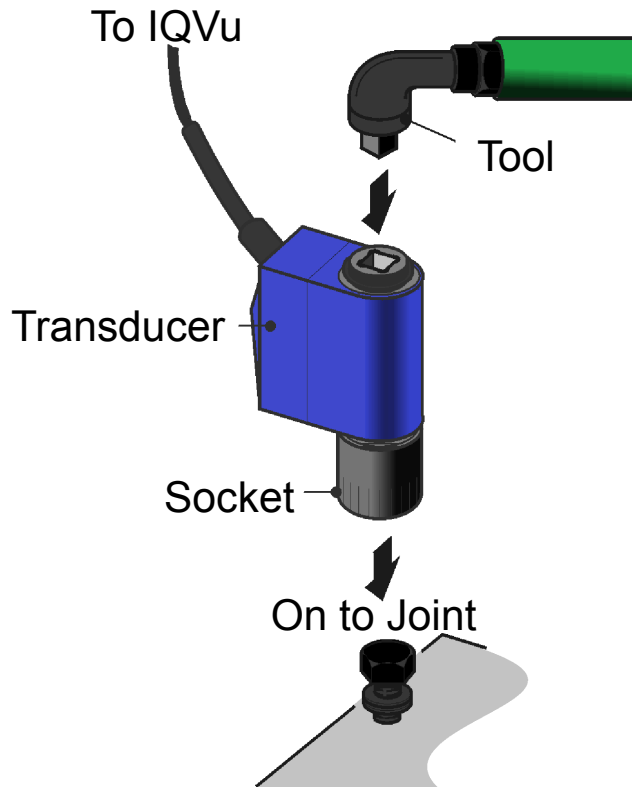


When all parameters are edited as required right swipe back to the measure screen



PERFORMING A CHECK MEASUREMENT

Once the check settings are configured as required insert the tool drive into the transducer and perform a tightening cycle.



This example below shows a Crane UTA CheckStar used for a dynamic measurement

TIP Ensure the “Torque Being Measured” indicator  is **GREEN** before beginning rundown.



When the rundown is complete IQVu displays the Torque and second parameter values along with a Torque Vs Time trace



CHECK MODE VIEW READINGS / ADD ATTACHEMENT

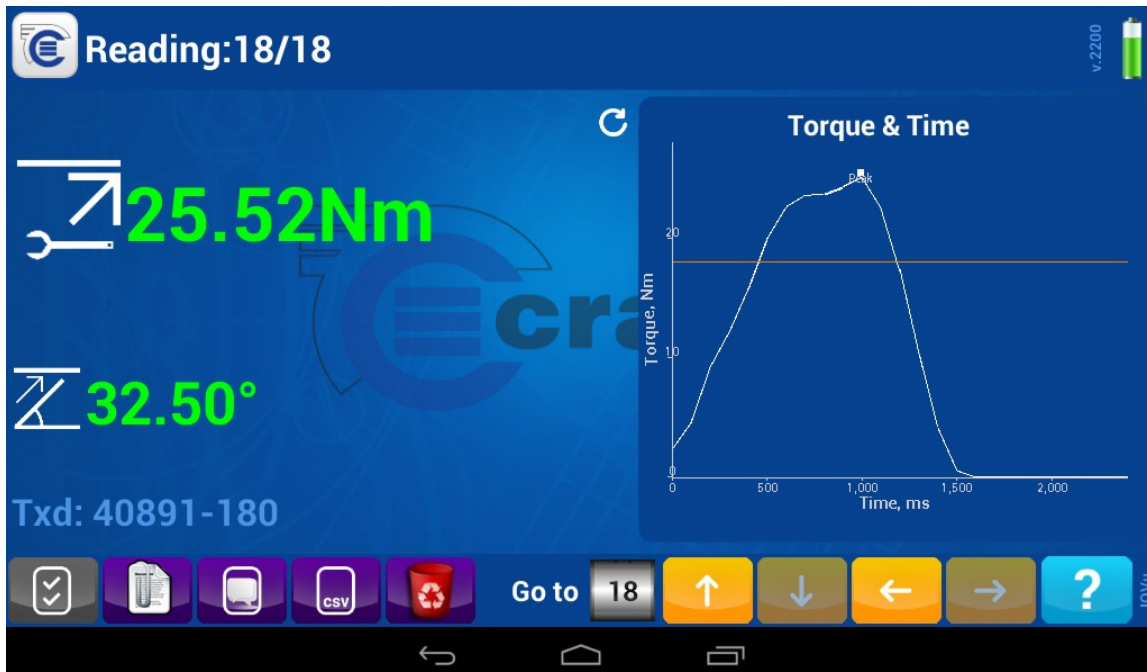
To view stored readings in check mode either swipe up or press the down navigation arrow icon.

Readings v.2200

Readings	Type	Torque, Nm	Peak, Nm	Peak, °	Final angle, °
Reading: 18/18	Peak	25.52	25.52	32.50	33.50
Reading: 17/18	Peak	28.76	28.76	54.00	72.00
Reading: 16/18	Peak	27.94	27.94	9.00	42.50
Reading: 15/18	Peak	27.34	27.34	14.00	88.50
Reading: 14/18	Peak	33.14	33.14	90.00	80.00
Reading: 13/18	Peak	23.17	23.17	1.50	7.50
Reading: 12/18	Peak	25.09	25.09	83.50	83.00
Reading: 11/18	Peak	20.14	20.14	24.00	17.50
Reading: 10/18	Peak	24.19	24.19	-2.00	-9.00
Reading: 9/18	Peak	11.14	11.14	57.50	87.00
Reading: 8/18	Peak	12.16	12.16	98.00	95.50

IQVu

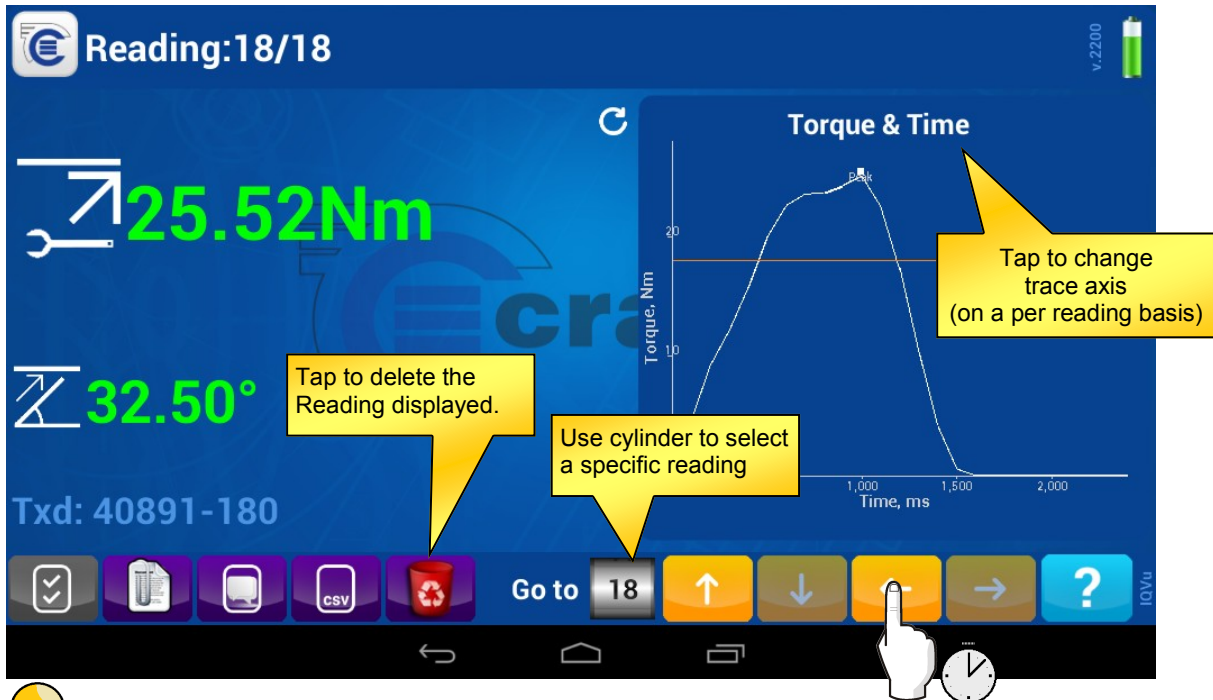
Tap the up arrow icon to view the individual readings





CHECK MODE VIEW READINGS / ADD ATTACHEMENT

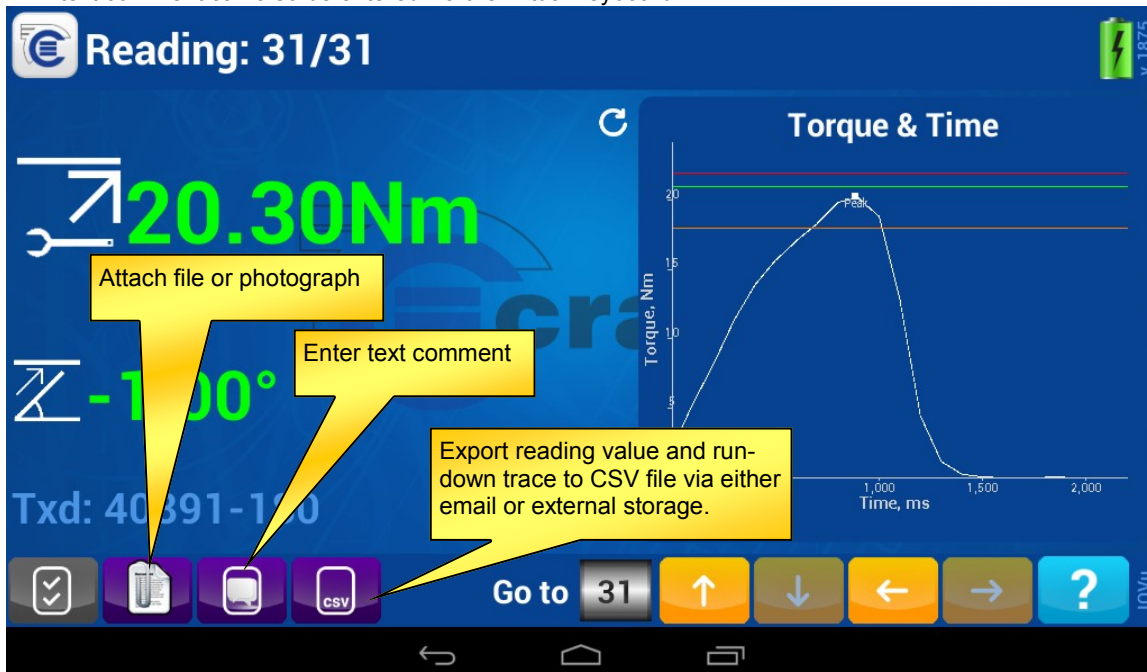
Individual readings can be viewed by swiping left / right or using the arrow key icons.



TIP Tap and hold the left / right arrow icon to goto first last readings

The IQVu allows the user to attach either a file(s) and / or photograph(s) to each reading.

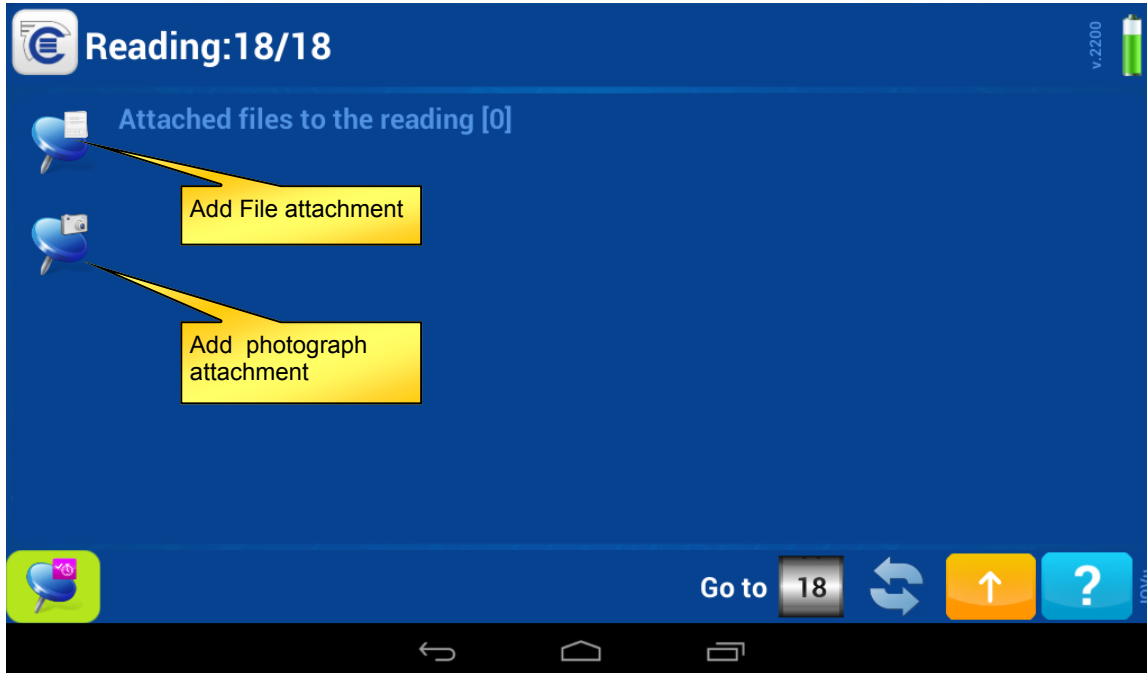
A text comment can also be entered via the virtual keyboard.



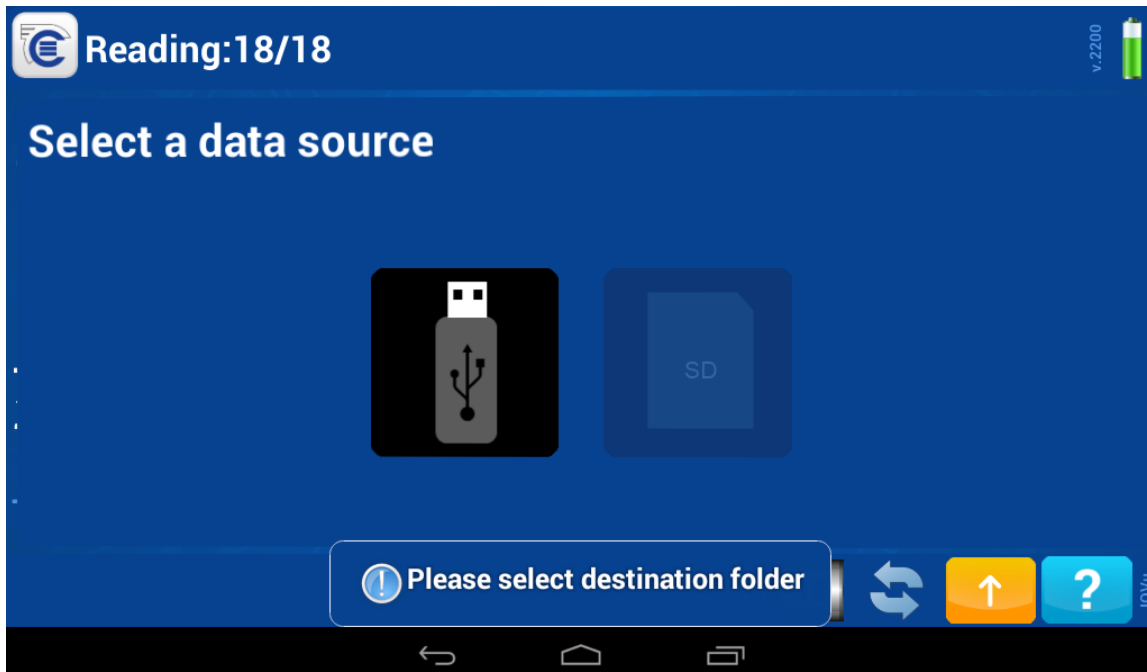
TIP Email requires a valid wifi network connection and user account setup.

CHECK MODE VIEW READINGS / ADD ATTACHEMENT CONTINUED

To view stored readings in check mode either swipe up or press the down navigation arrow icon.



To attach a file, tap on the "Attach File" icon

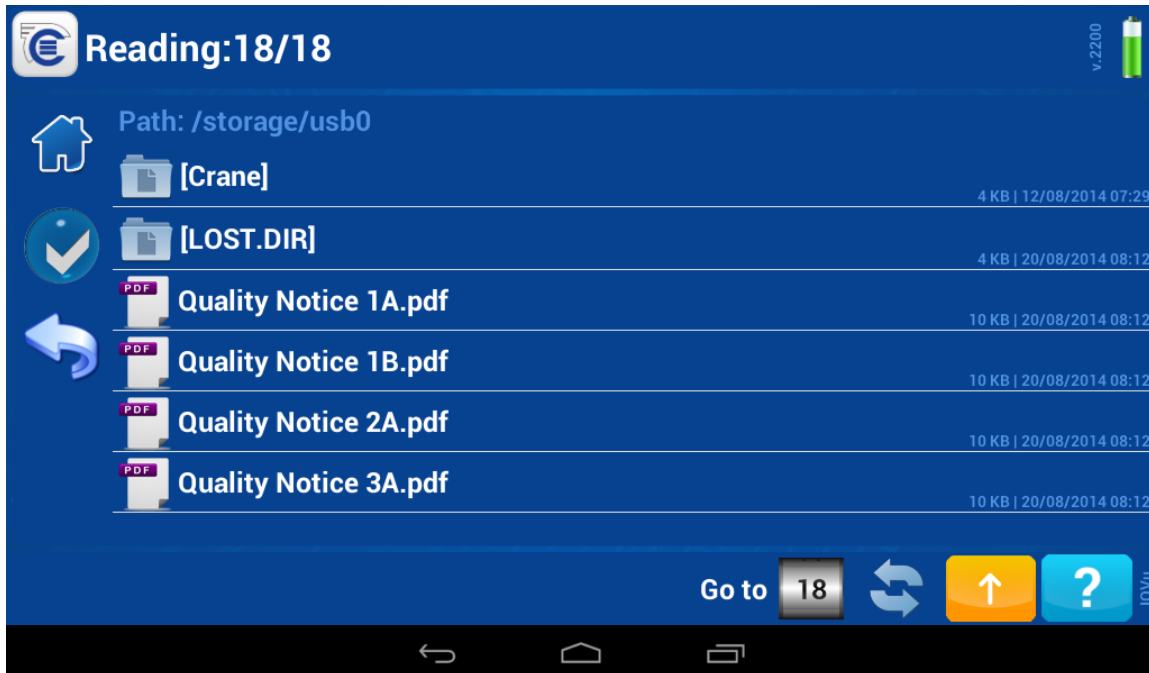


IQVu allows supports files stored on either USB drive or SD card. When not available the corresponding icon will be greyed out.

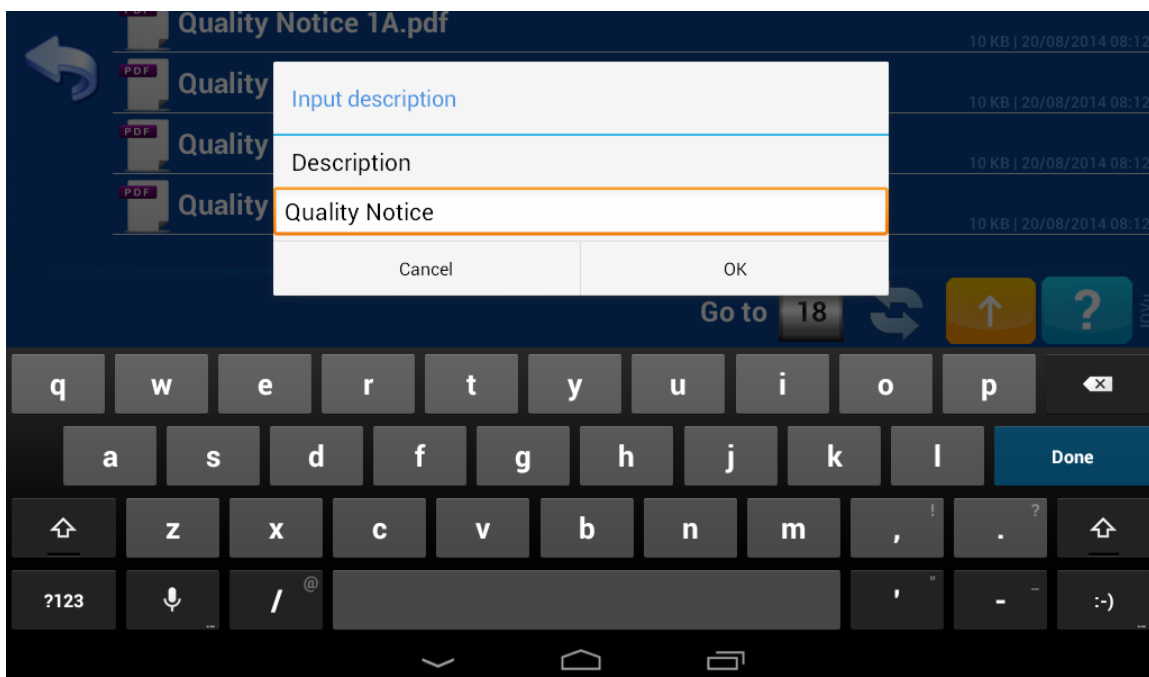


CHECK MODE VIEW READINGS / ADD ATTACHEMENT CONTINUED

Tap on the tile to be attached to the reading.

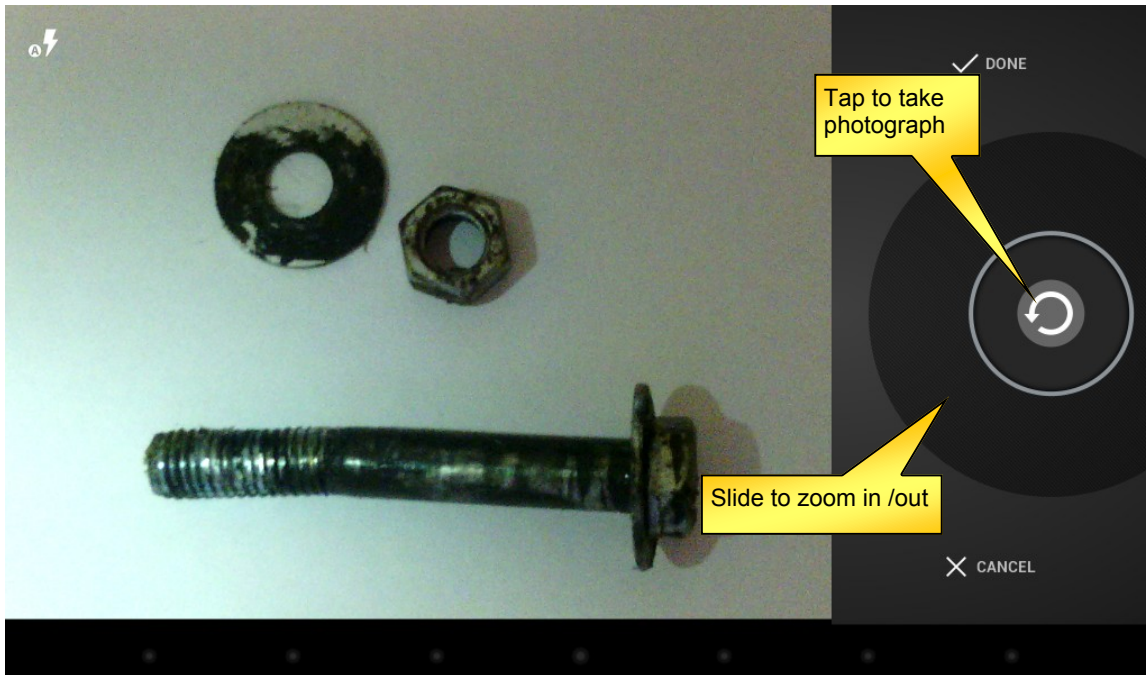


The IQVu allows to the user to add a description for the file to be attached.

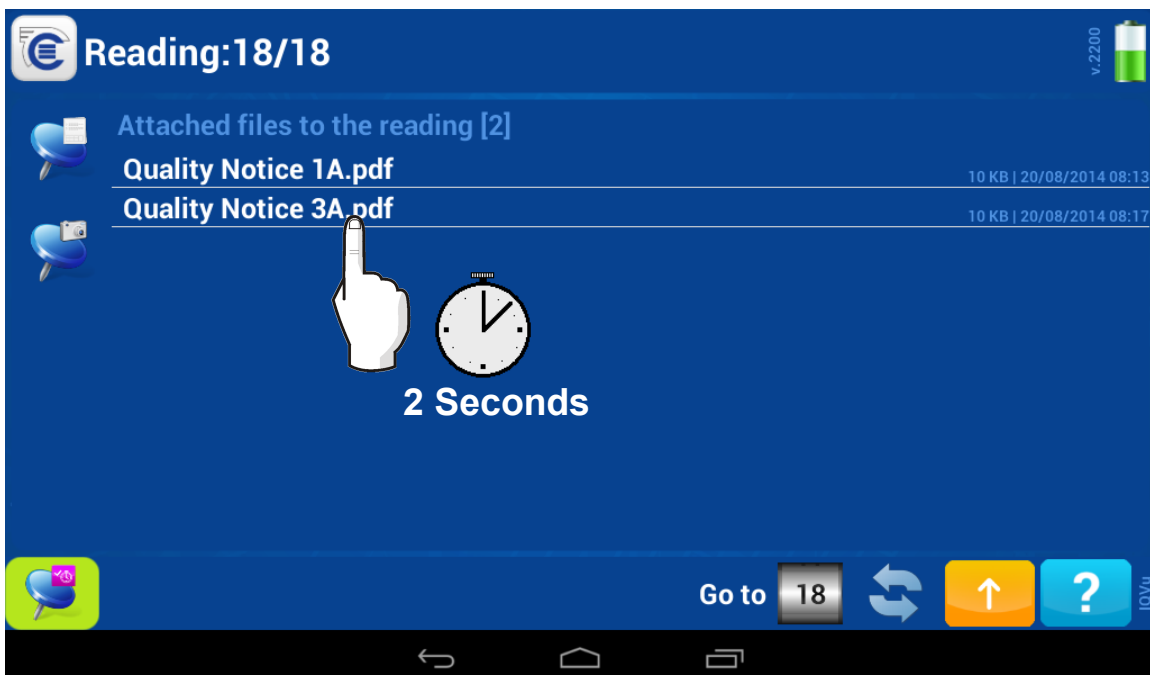


CHECK MODE VIEW READINGS / ADD ATTACHEMENT CONTINUED

To attach a photograph click on the “Add Photograph” icon. This will automatically load the on board camera app



To remove an attachment from the reading simple tap and hold on the file for 2 seconds

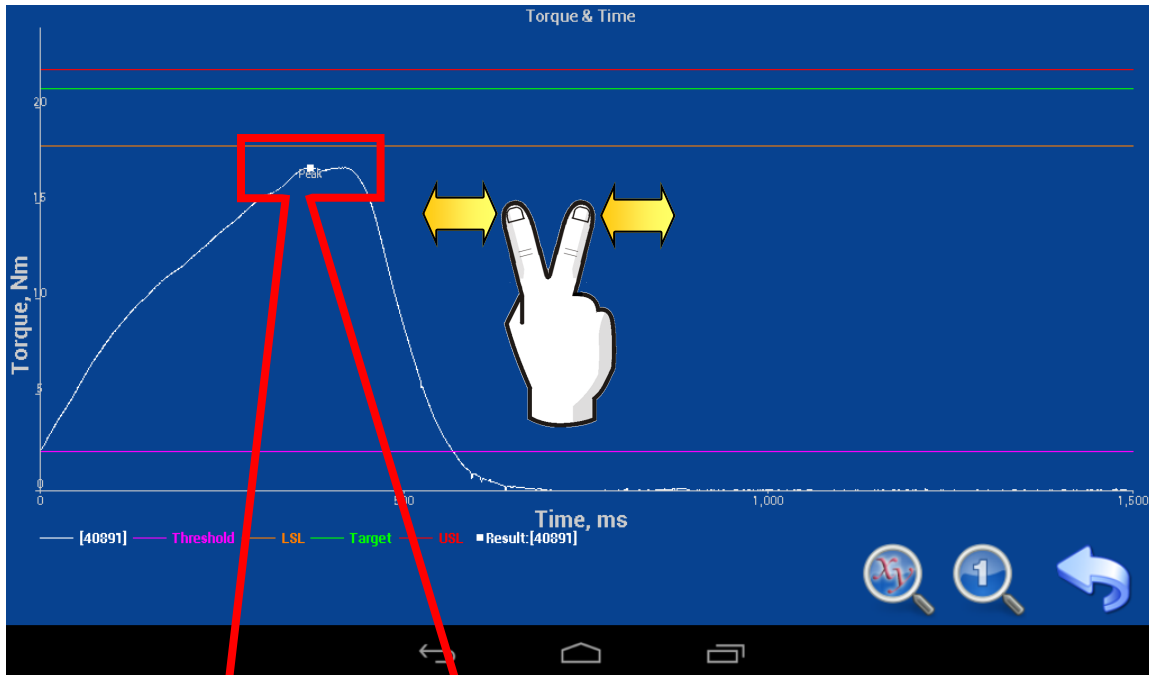


IQVu will display a “Delete” popup message, followed by a confirmation “Yes / No.”



CHECK MODE VIEW READINGS / RUNDOWN TRACE

When in view readings it is possible to view the rundown trace in greater detail. Simply select the reading to examine and tap on the trace



Using 2 fingers to tap and hold, pinching together will zoom out, pinch apart will zoom in.

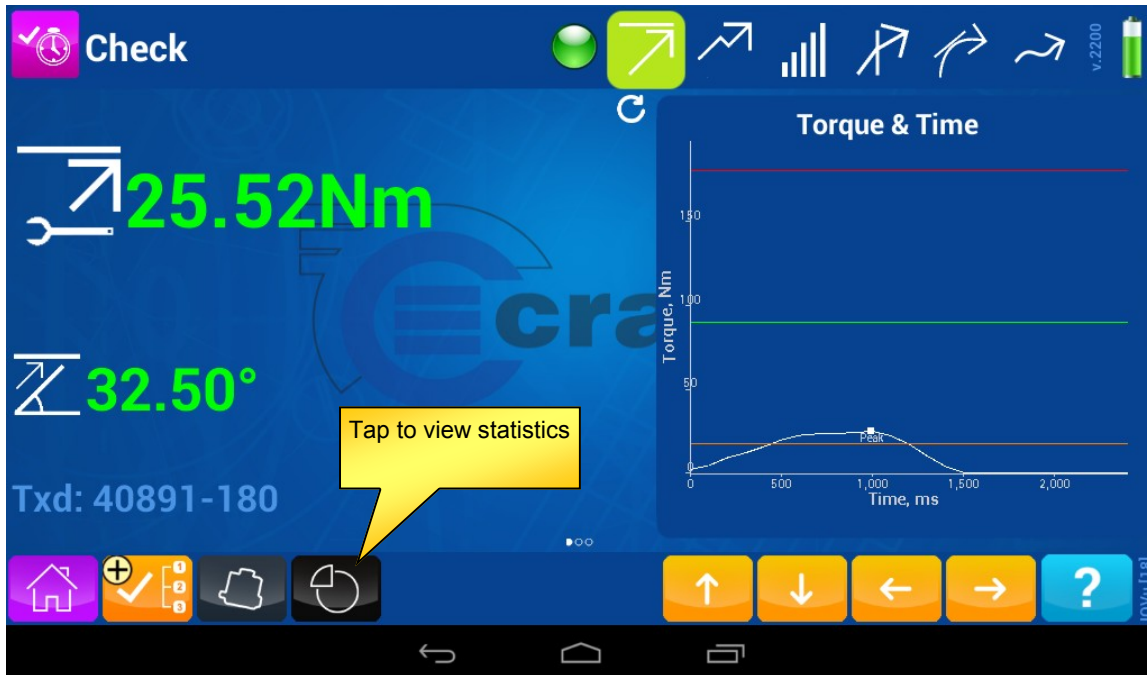


Using a single finger to tap and hold dragging around the screen will pan over the trace.

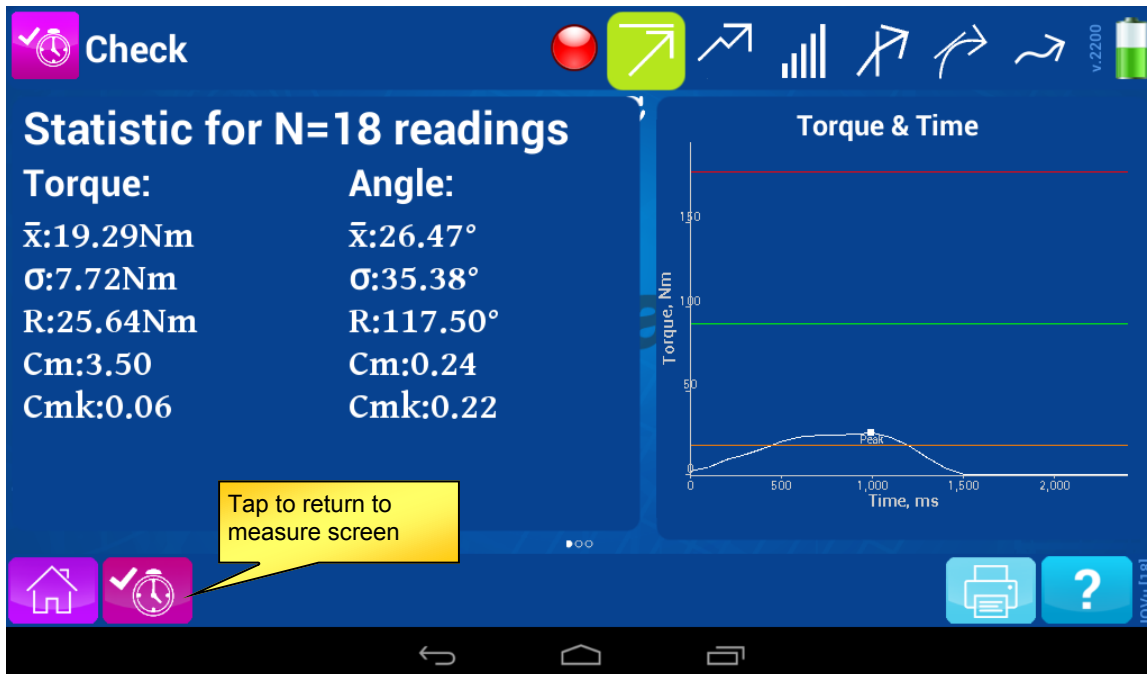


CHECK MODE VIEW STATISTICS

IQVu provides statistical analysis for the readings taken.



Calculations include σ , $\bar{X}$, R, Cp, Cpk, Cm and Cmk





CHECK MODE SAVE TO JOB

After a check mode configuration is complete it is possible to create a job from the settings.



Jobs contain more settings than check measurement such as "Name", "Description", "Readings", "Subgroups" and "Transducer Type". Enter the required values to complete the Job setup.



Padlock needs to be opened before editing is allowed. Please refer to "IQVu navigation" in this manual for further details.

Store graph	Control	Direction	Limits	2nd param
Manual	Angle	CCW	Percentage	None
Always	Torque	CW	Absolute	Angle
Never	Angle	Auto	Percentage	None

☐ Comments required for subgroups ☐ Use CL ☒ Use Graph

Retries Type	Txd Type
Manual	Model
Never	Exact
Retry	Any

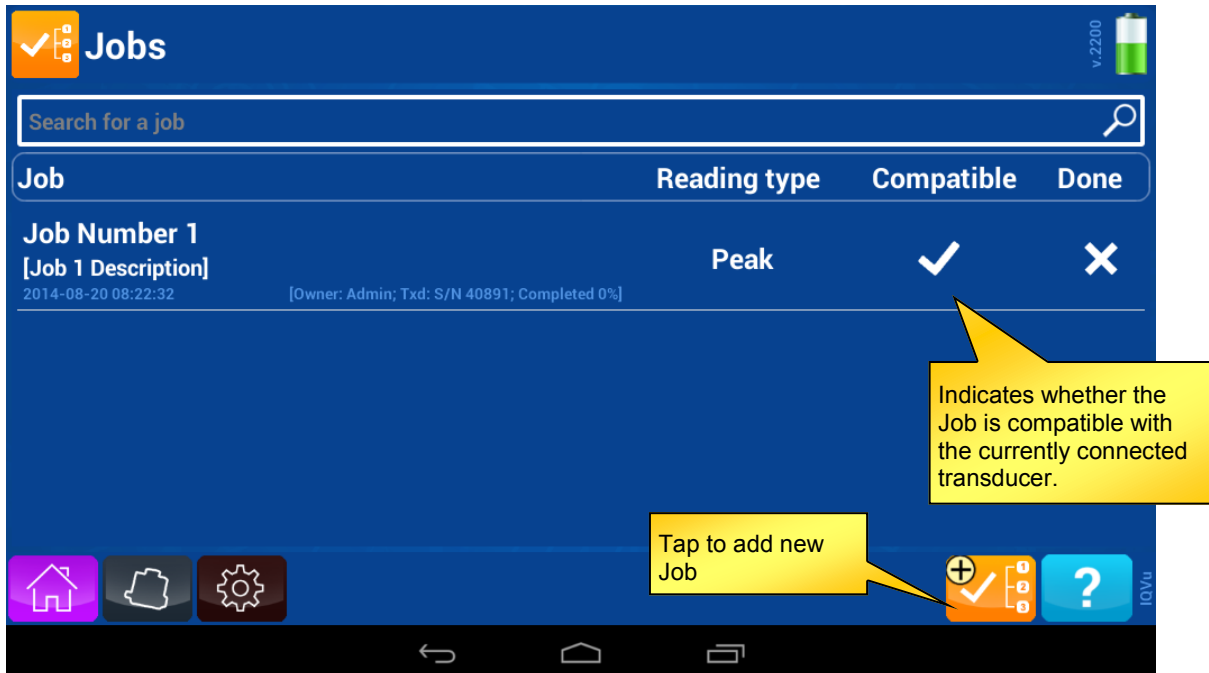
Readings per subgroup: 1 Subgroups per job: 1

After saving the Job setup IQVu will automatically navigate to the Job list screen



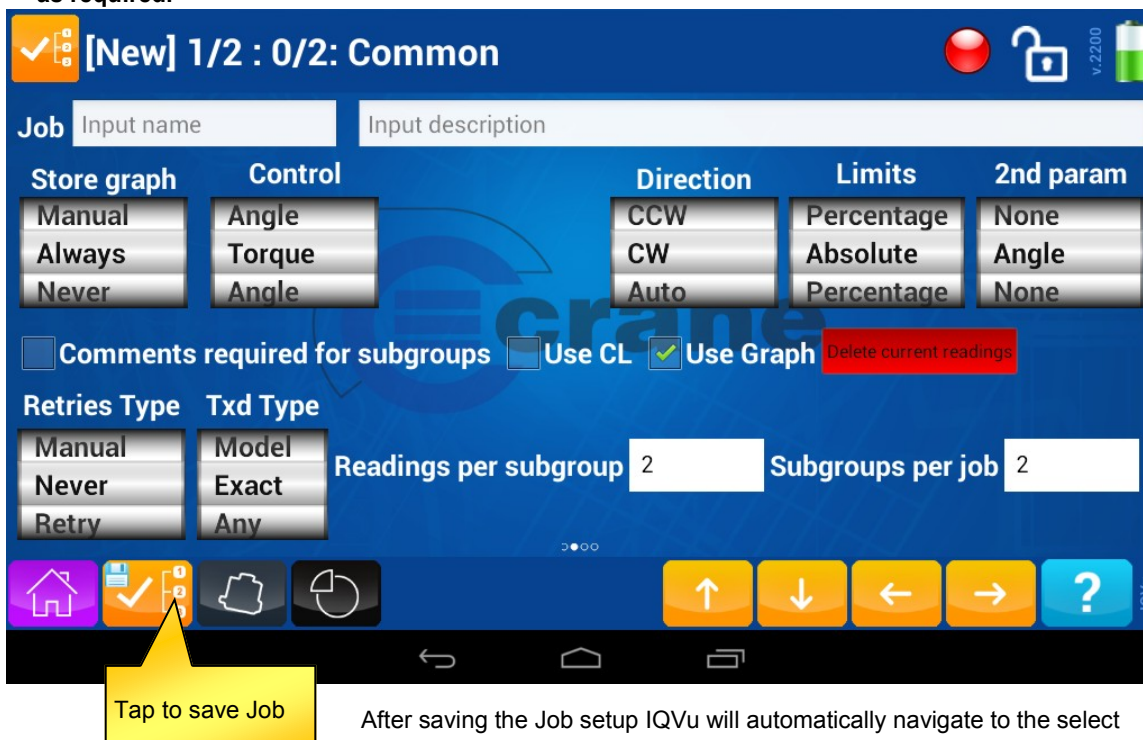
JOB MODE

When selecting the Job icon from the Home menu the user is presented with the list of currently stored Jobs.



To create a new Job tap the “Add Job” icon in the bottom corner of the screen. The IQVu will prompt for 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 icon and configure the settings as required.



After saving the Job setup IQVu will automatically navigate to the select transducer screen, then to the measure screen.



JOB MODE CONTINUED

IQvu features the ability to attach a file or photo to the Job setup. This can be accessed by the user when performing the Job and used a work instruction.



The screenshot shows the 'Job' setup screen in the IQvu application. At the top, there's a status bar with a checkmark icon, the text '[New] 1/2 : 0/2: Common', and icons for a red light, a lock, and a battery level indicator (V-2200). Below this, there are two input fields: 'Input name' and 'Input description'. The main area contains several sections of controls:

- Store graph:** Buttons for 'Manual', 'Always', and 'Never'.
- Control:** Buttons for 'Angle', 'Torque', and 'Angle'.
- Direction:** Buttons for 'CCW', 'CW', and 'Auto'.
- Limits:** Buttons for 'Percentage', 'Absolute', and 'Percentage'.
- 2nd param:** Buttons for 'None', 'Angle', and 'None'.
- Options:** Checkboxes for 'Comments required for subgroups', 'Use CL', and 'Use Graph'. A red button labeled 'Delete current readings' is also present.
- Retries Type:** Buttons for 'Manual', 'Never', and 'Retry'.
- Txd Type:** Buttons for 'Model', 'Exact', and 'Any'.
- Readings per subgroup:** A numeric input field with the value '2'.
- Subgroups per job:** A numeric input field with the value '2'.

At the bottom, there's a navigation bar with icons for home, a checkmark, a camera, a pie chart, and a set of four directional arrows (up, down, left, right) with a question mark icon. The IQvu logo is visible in the bottom right corner.

To attach a file or photograph work instruction tap and hold the left arrow key



The screenshot shows the 'Job' setup screen in the IQvu application, specifically the 'Attached files to current job [0]' section. The title bar at the top shows a checkmark icon, the text 'Job Number 1' 1/3 : 1/2, and icons for a red light, a green arrow, and a battery level indicator (V-2200). The main area displays two blue icons representing file attachments. Two yellow callout boxes point to these icons:

- The first callout box points to the first icon and contains the text 'Add File attachment'.
- The second callout box points to the second icon and contains the text 'Add photograph attachment'.

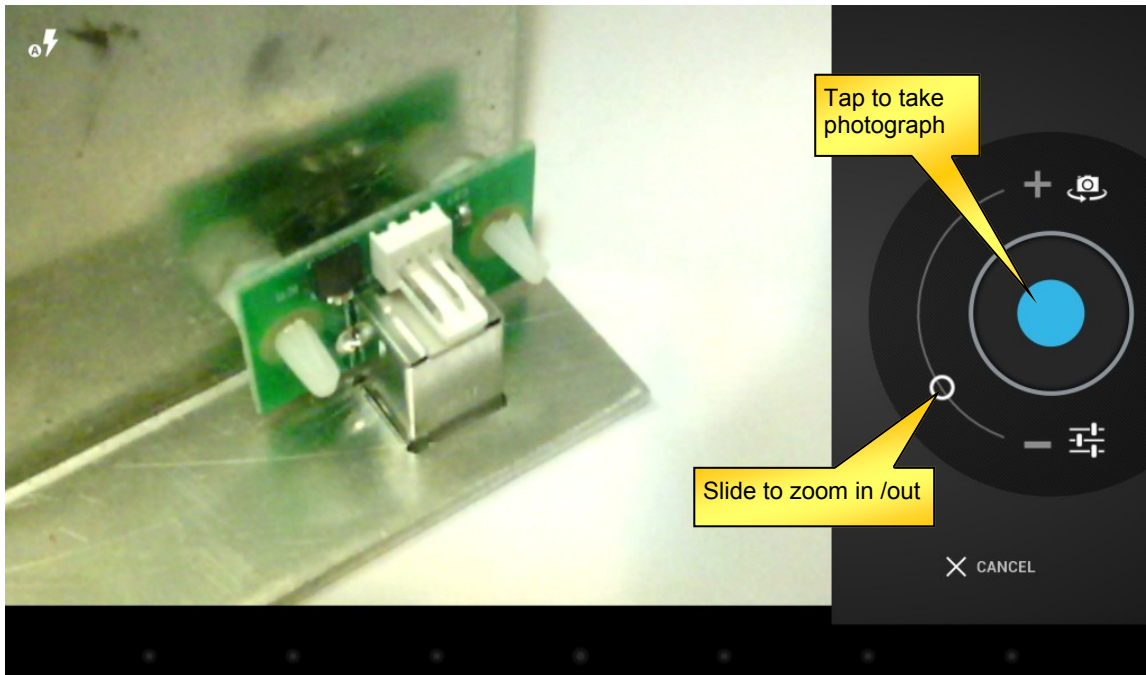
At the bottom, there's a navigation bar with icons for a checkmark, a camera, a refresh icon, a set of four directional arrows (up, down, left, right), and a question mark icon. The IQvu logo is visible in the bottom right corner.

To attach a file tap on the "Add file" icon and select the required file. Tapping the "Add Photograph" icon will automatically launch the camera app..

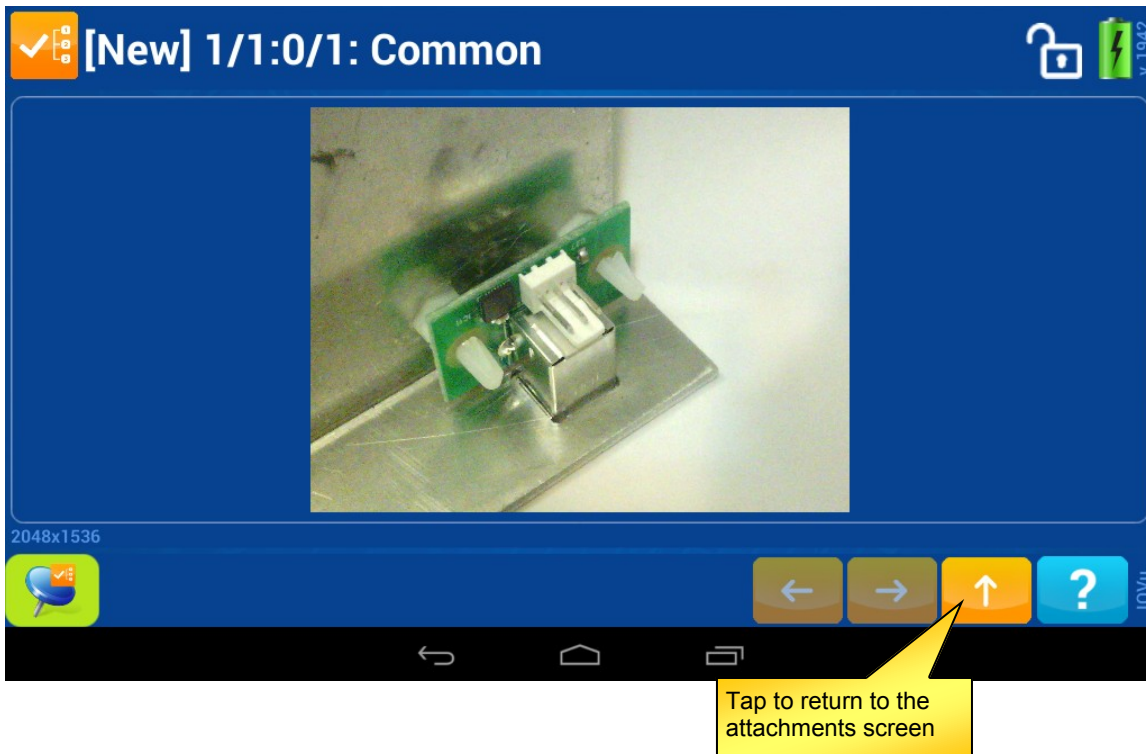


JOB MODE CONTINUED

Use the camera controls on the right side of the screen to zoom in / out and take the photograph



Tap "Done" to accept the photograph or "Cancel" to return to the attachments screen.

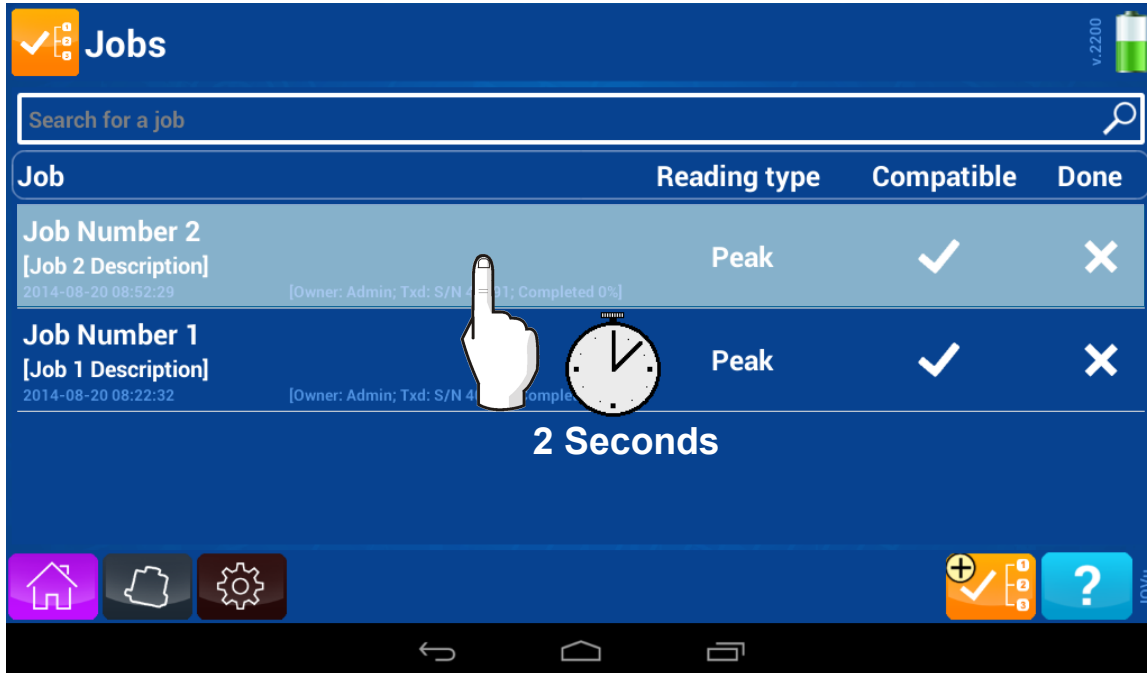




JOB MODE CONTINUED

Once a Job is stored in IQVu, it is possible to perform a number of actions with it.

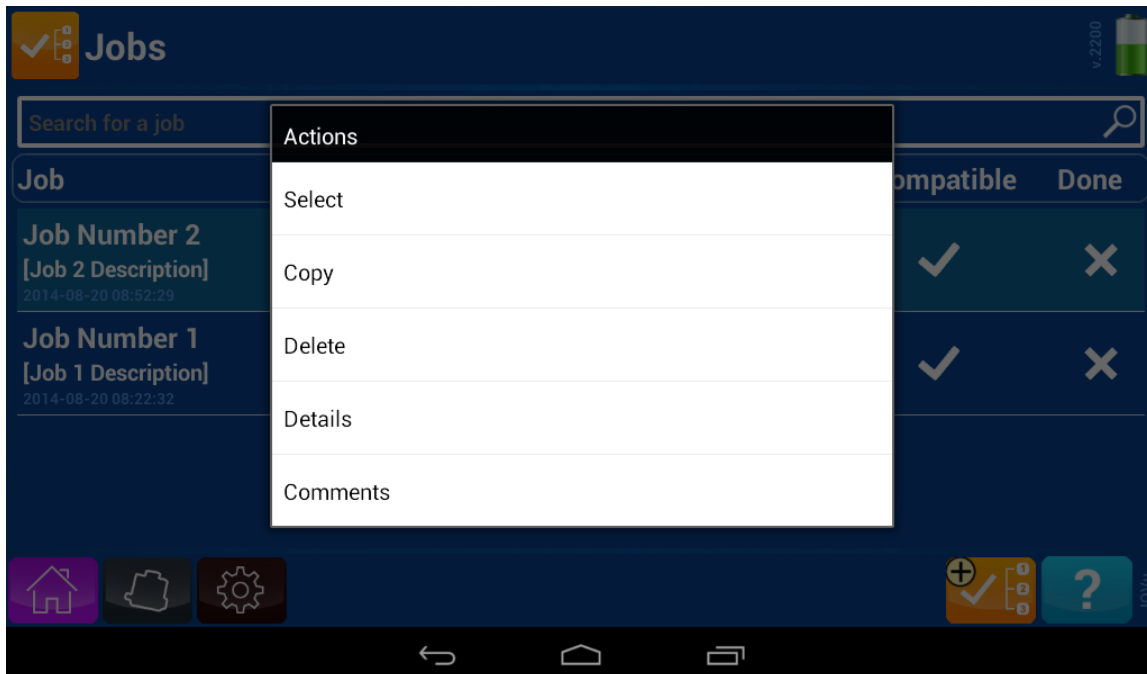
The Job can either be copied, exported or modified to allow more subgroups worth of information.



Tap and hold on the Job required and IQVu will display a popup menu.



Jobs originating from a PC are not allowed to be modified.



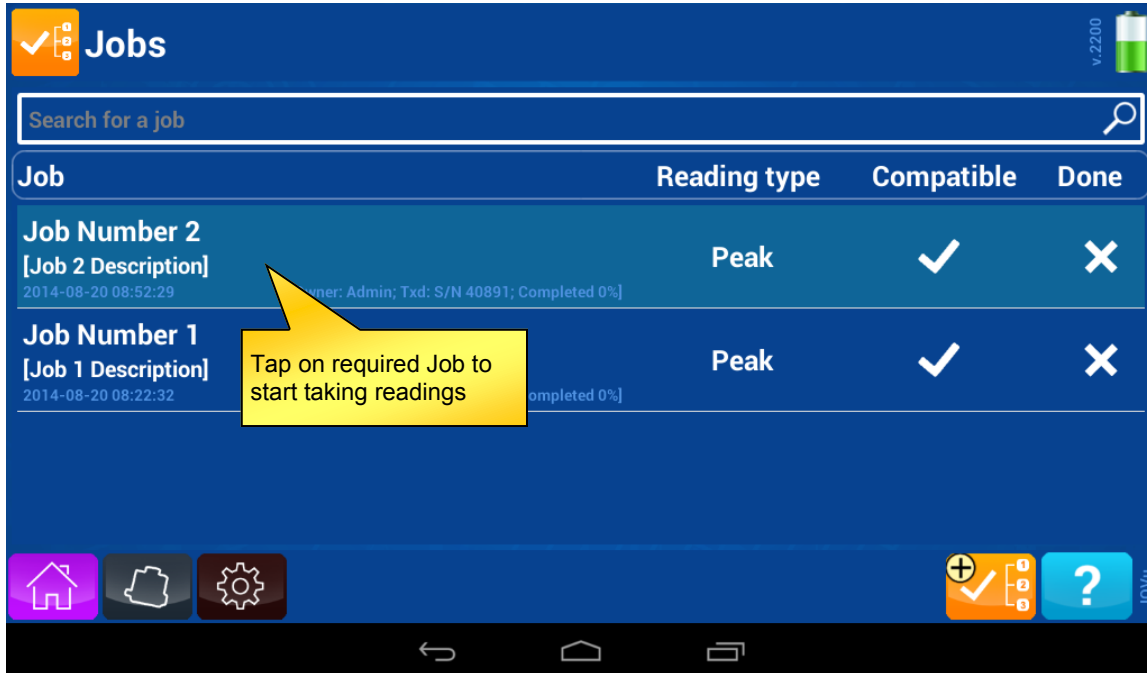
Tap on the action to perform. If a Job is complete, a further option will be displayed to “Add Subgroup”

If a subgroup is added the Job will no longer be marked as complete and the user may take further readings.



JOB MODE PERFORMING MEASUREMENTS

It is possible to search for jobs using the input box provided. With the use of optional barcode reader the User can also scan the Job name to search for.



To starting taking readings against a Job simply tap on the required name in the list displayed.

See “Performing Check Measurement” for example of hardware use.

When the defined number of readings have been taken, IQVu will display “End” and will not allow further measurements.

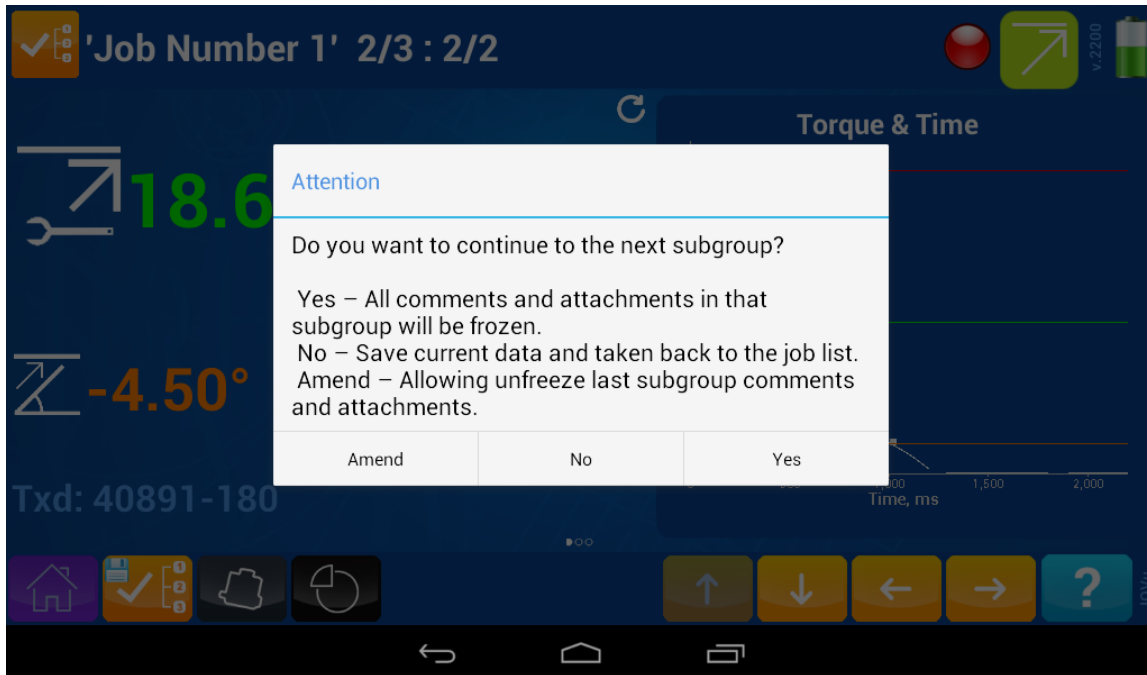


To view readings, statistics rundown traces and add files / photographs use the same method as defined for check mode in this manual.

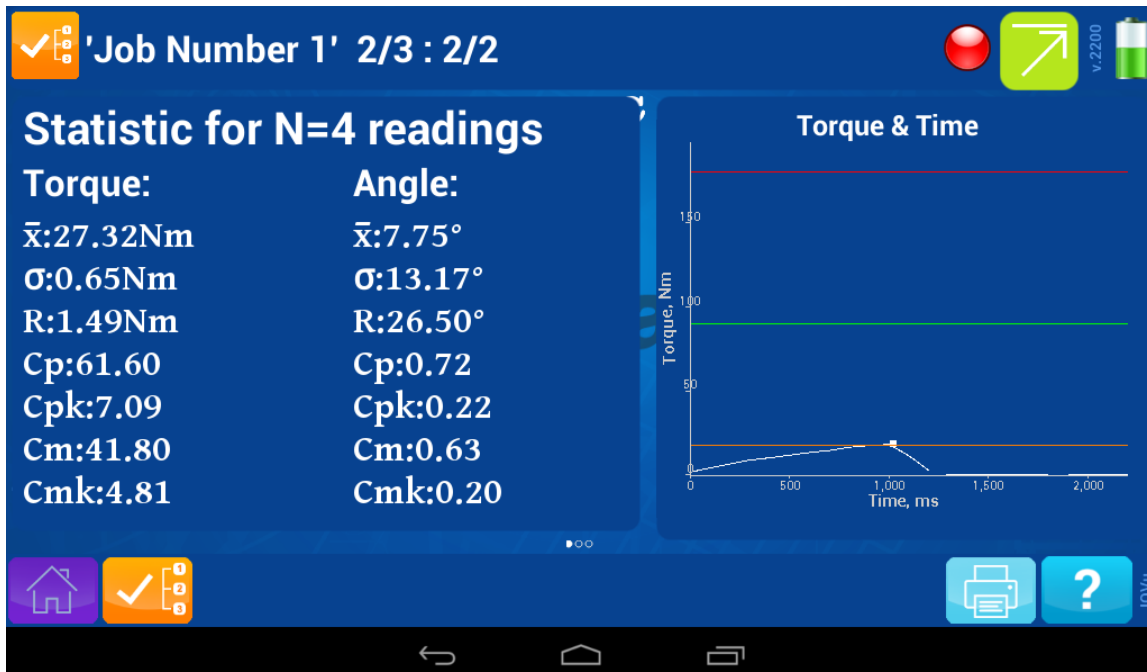


JOB MODE PERFORMING MEASUREMENTS / VIEW STATISTICS

If a job is configured for multiple subgroups IQVu will prompt the user at the end of each subgroup



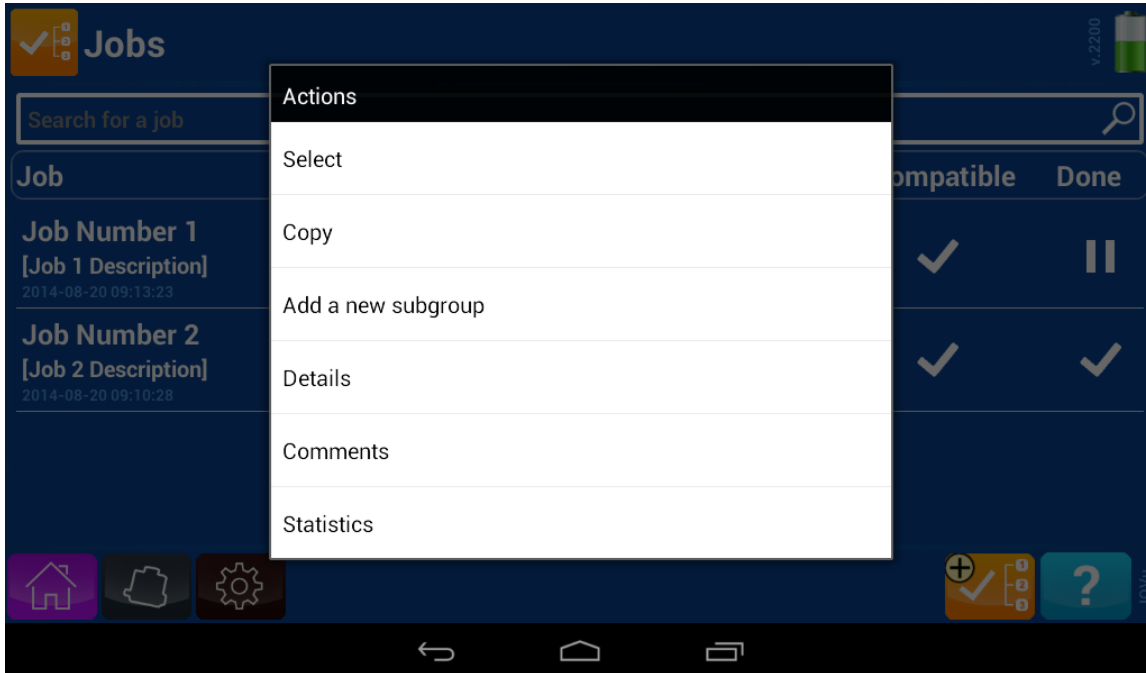
To view statistics in Job mode tap on the Statistics icon





JOB MODE PERFORMING MEASUREMENTS / VIEW STATISTICS

Statistics can also be viewed directly from the Job list. Tap and hold on the required Job to reveal the pop-up menu and select "statistics"



The IQVu will display the Job header information followed by the readings for each subgroup, including summary. After the last subgroup data IQVu will display statistical analysis for all completed subgroups

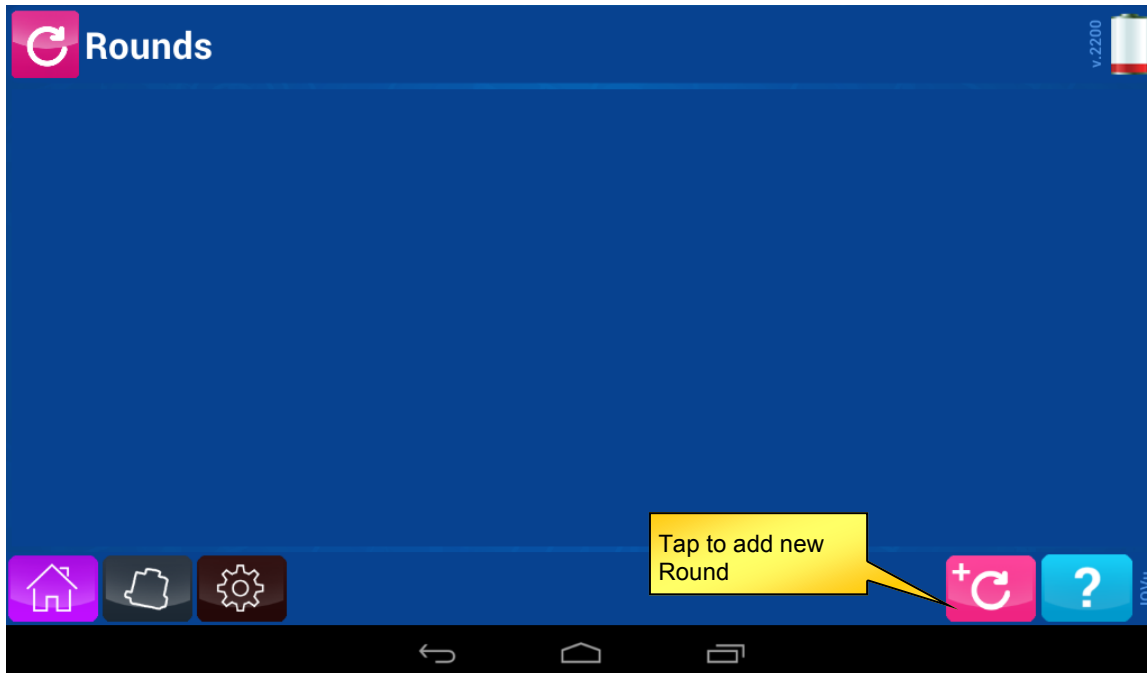


To view more data swipe up/down.

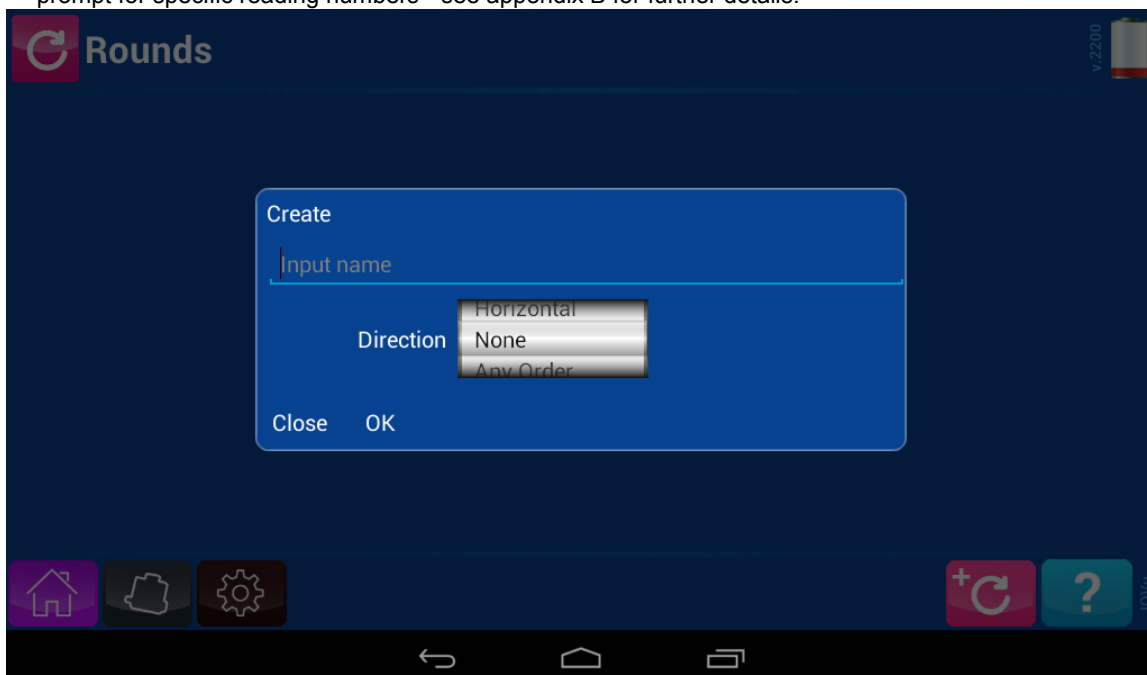


ROUND MODE

IQVu features a “Round” mode which allows the user to group together Jobs and configure the order in which readings are taken



A new Round can be created as either SMLTN (simultaneous) or SQNTL (sequential). SQNTL allows the user to configure either Any order, Vertical or Horizontal reading entry. Any order allows the user to select a given job from the list provided whilst Vertical and Horizontal prompt for specific reading numbers - see appendix B for further details.

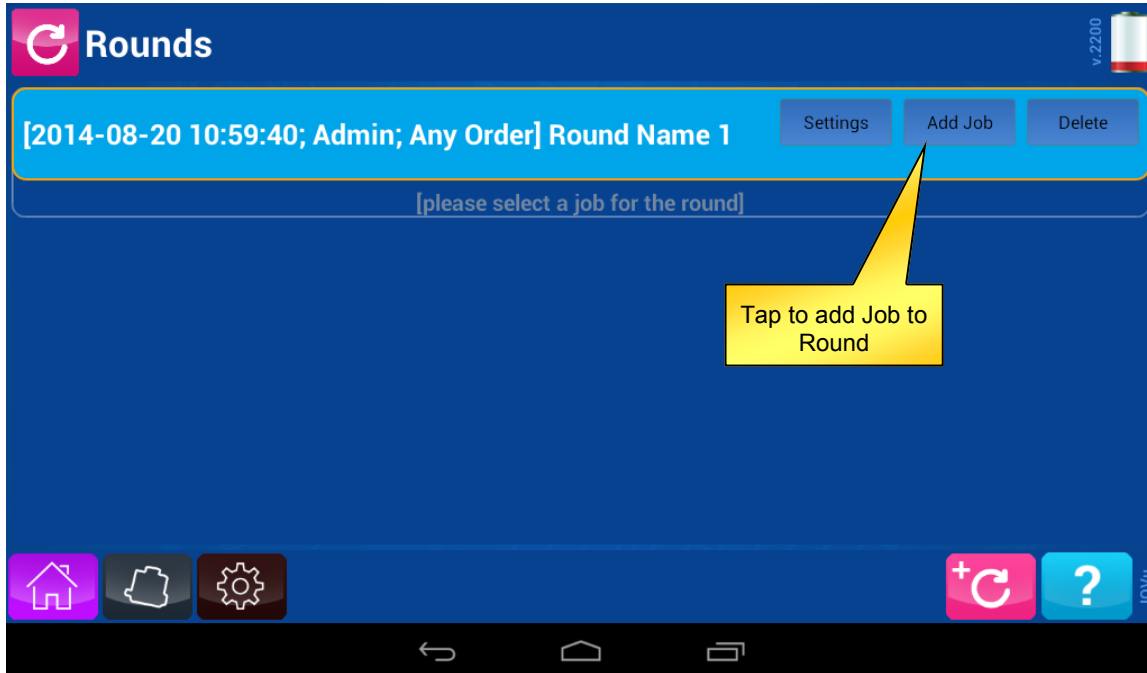


Enter data into fields presented and tap OK to create the Round.

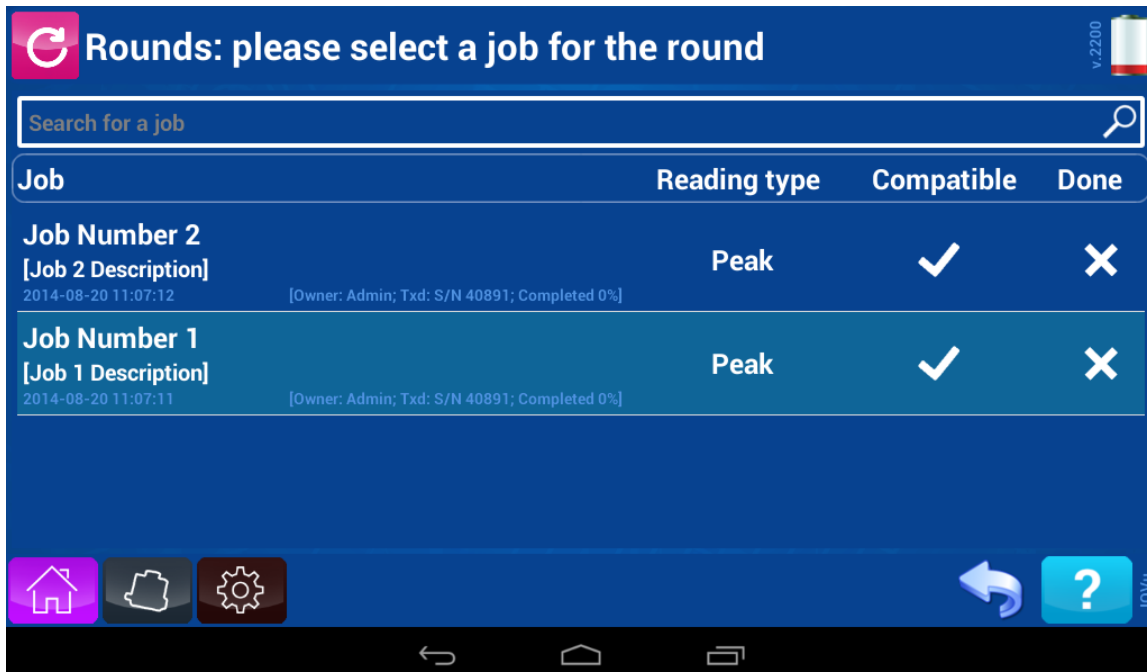


ROUND MODE CONTINUED

Once a round is created Jobs can be added to it.



Simply tap on the Job to be added from the list displayed.

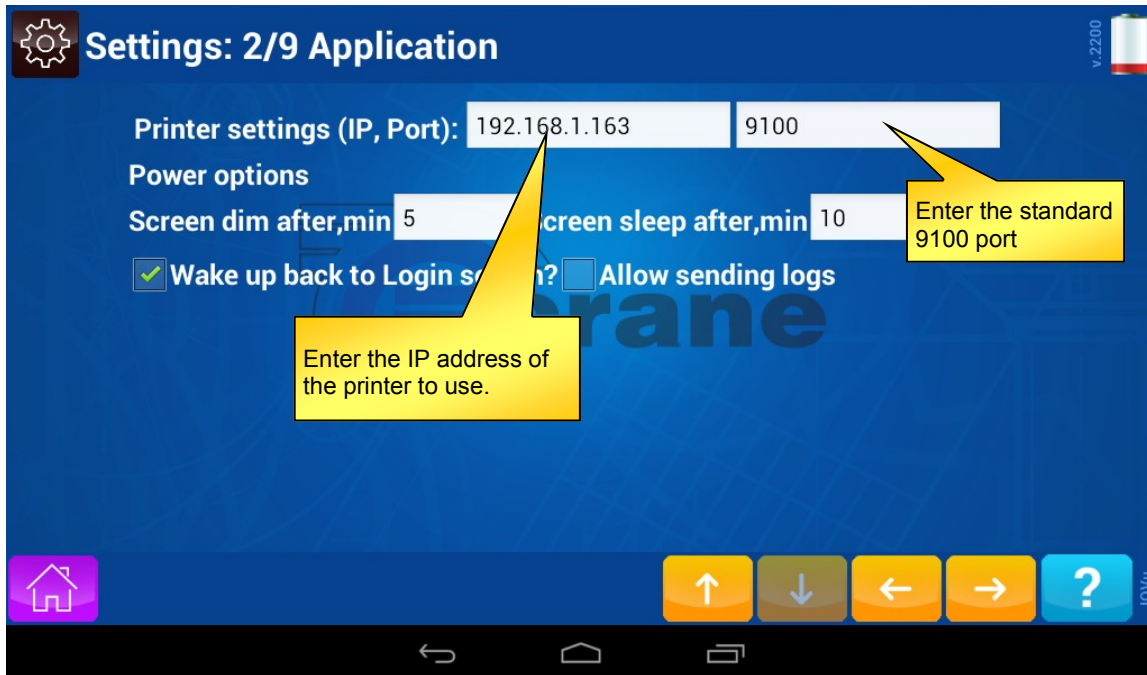


Once selected the IQVu will return to the Round list screen.

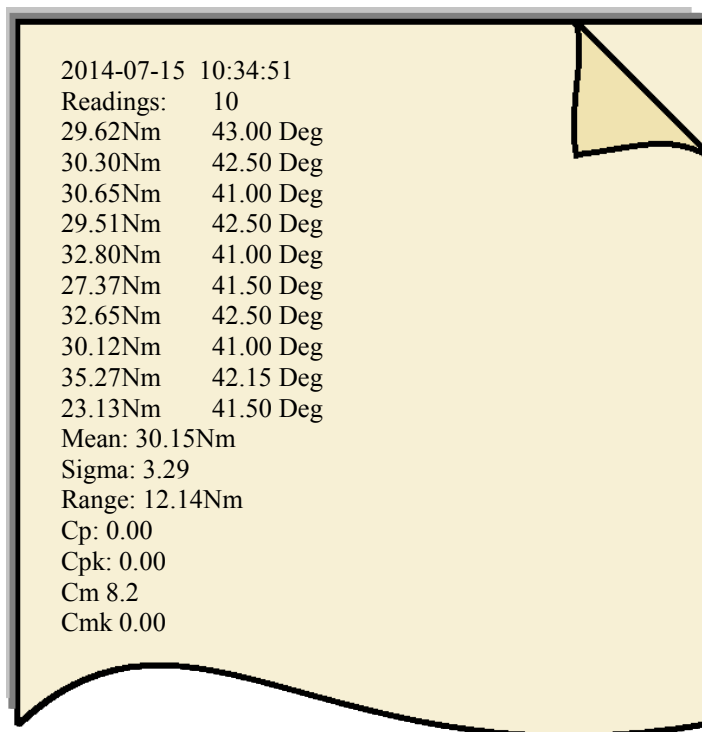


PRINTING

There are a number of areas in the IQVu app that allow printing. Printing from the IQVu is done via wifi connection. A valid printer must be configured in order to access this function.



The print information is in "raw" format and therefore there are no formatting options.

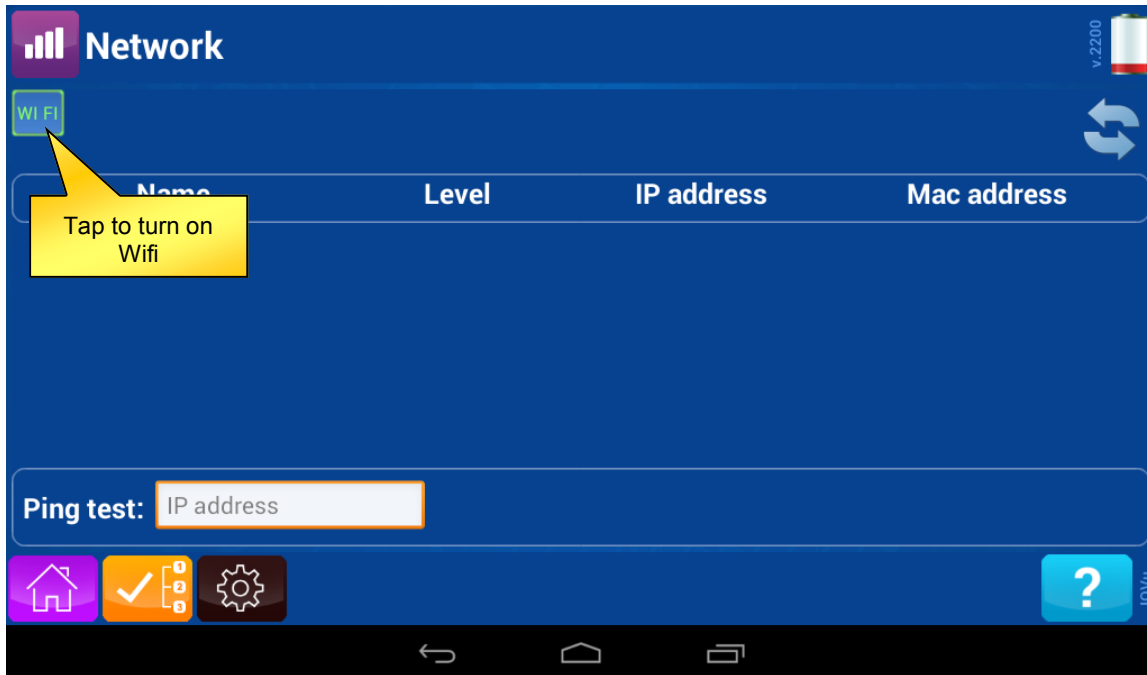


Where the option to print is available simply tap on the print icon



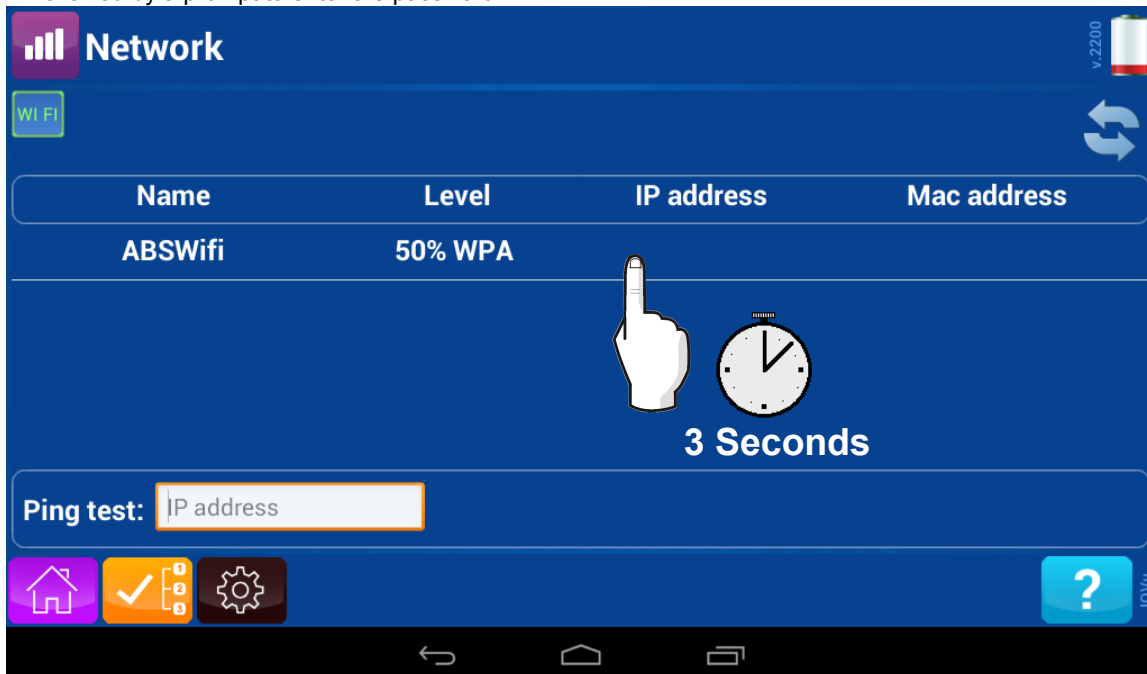
NETWORK

IQVu can be configured to join a Wifi network. There are various functions that will require a valid network connection including email, export of readings or connection to tool controllers.



When the Wifi function is ON IQVu will display a list of available networks.

To join a network tap and hold the required line for 3 seconds and a popup menu will prompt to "Connect" followed by a prompt to enter the password.

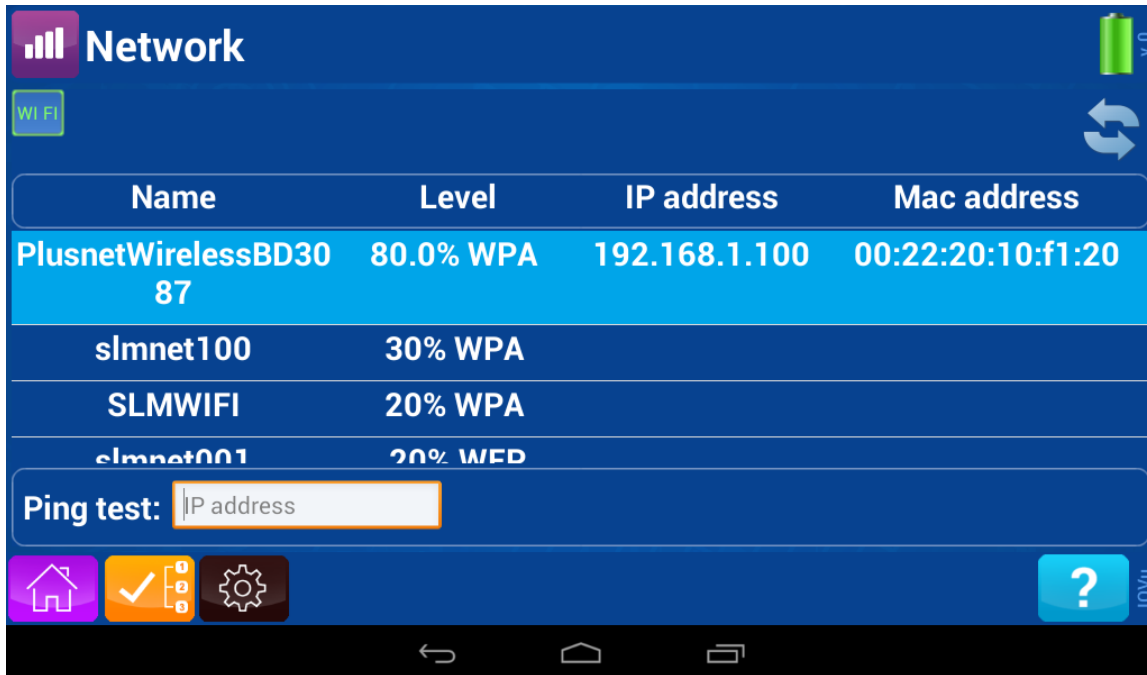


To disconnect from a network use the same procedure,. The popup menu will display "Forget" in place of connect.

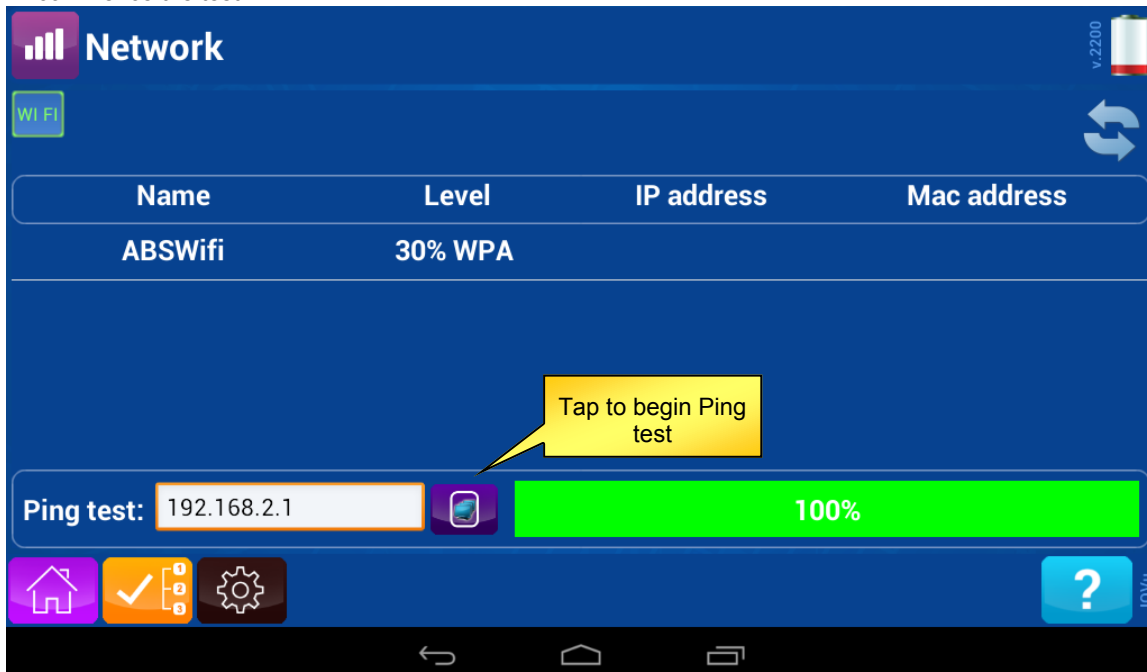


NETWORK CONTINUED

Once connected to a network IQVu will display the IP and Mac addresses.



To test the connection IQVu has the ability to perform a “Ping” test. Simply enter the IP address of a known computer on the same network, ensuring it is on with a valid connection, then tap the icon to commence the test.



As the ping test progresses, the status bar will change from red to amber and finally to green if successful.



EMAIL

To setup an email account select the email icon from the from SOTI Mobicontrol screen.

Enter the address and password in the fields provided.

Select the type of account to setup

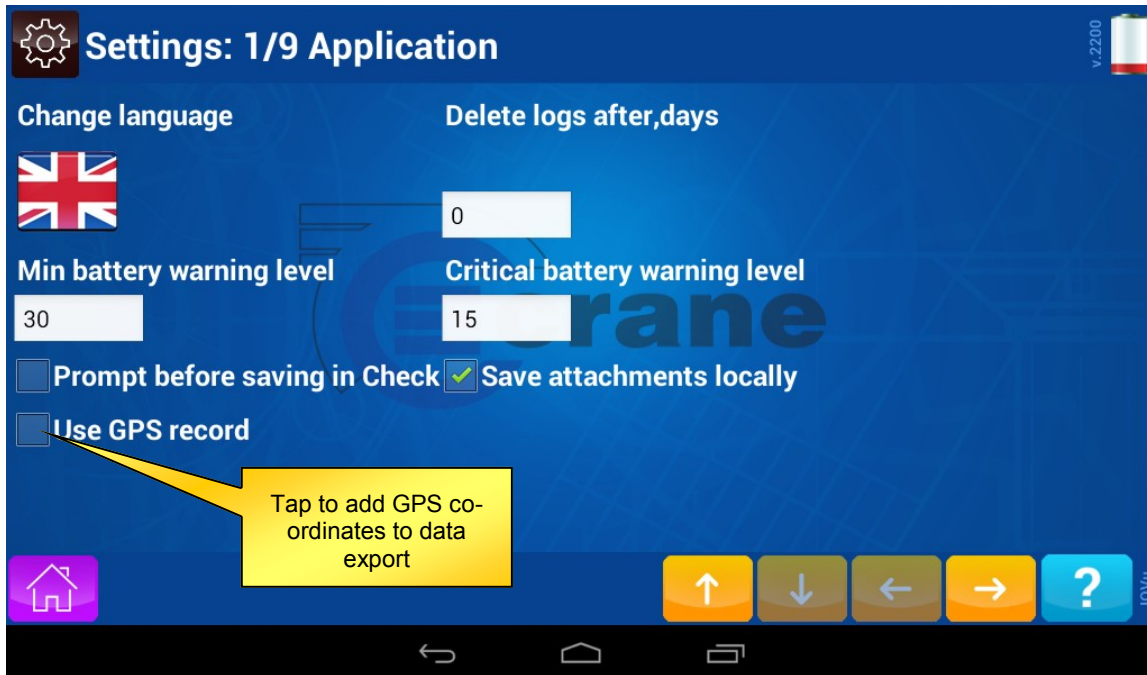


Contact your I.T representative for the required account settings.

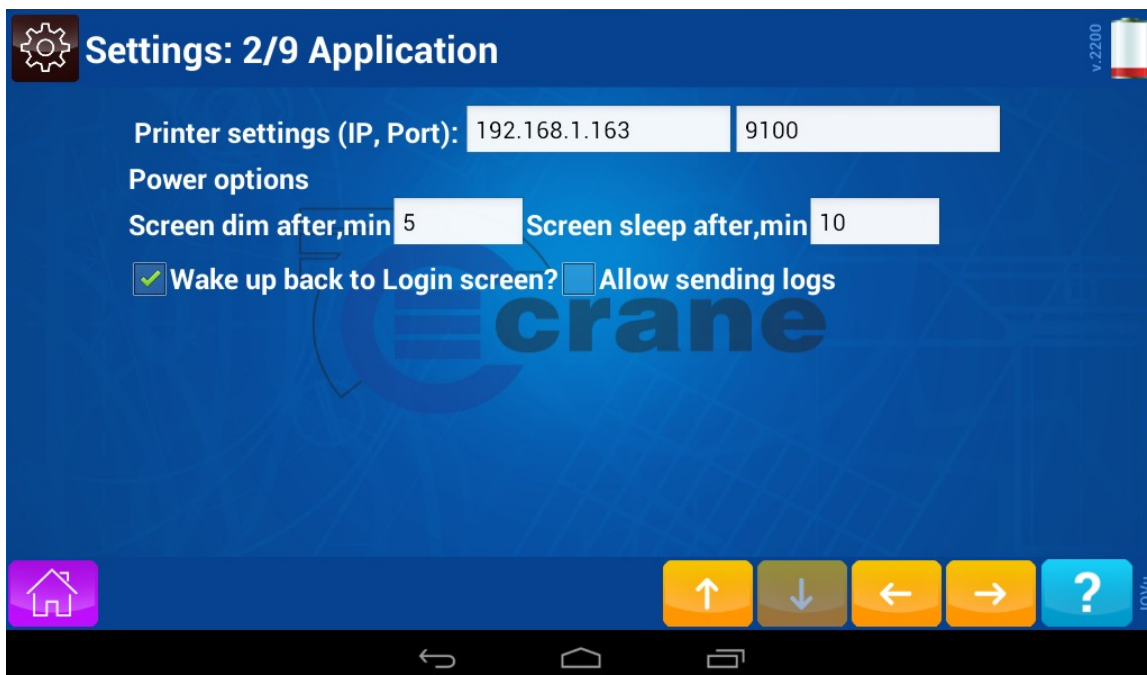


SETTINGS

Settings in the IQVu can only be accessed by an admin level User.



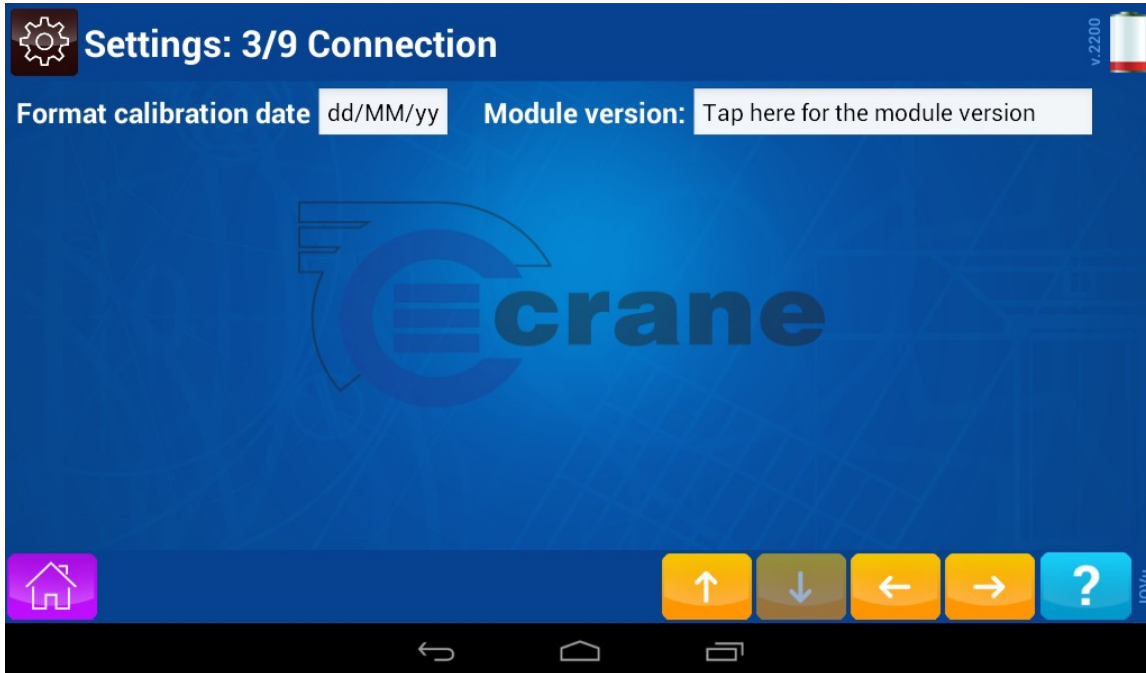
TIP GPS needs to be enable via SOTI in order to use this setting. Please contact Crane.





SETTINGS

The Module version refers to the firmware revision running in the torque module on the rear of the IQVu.



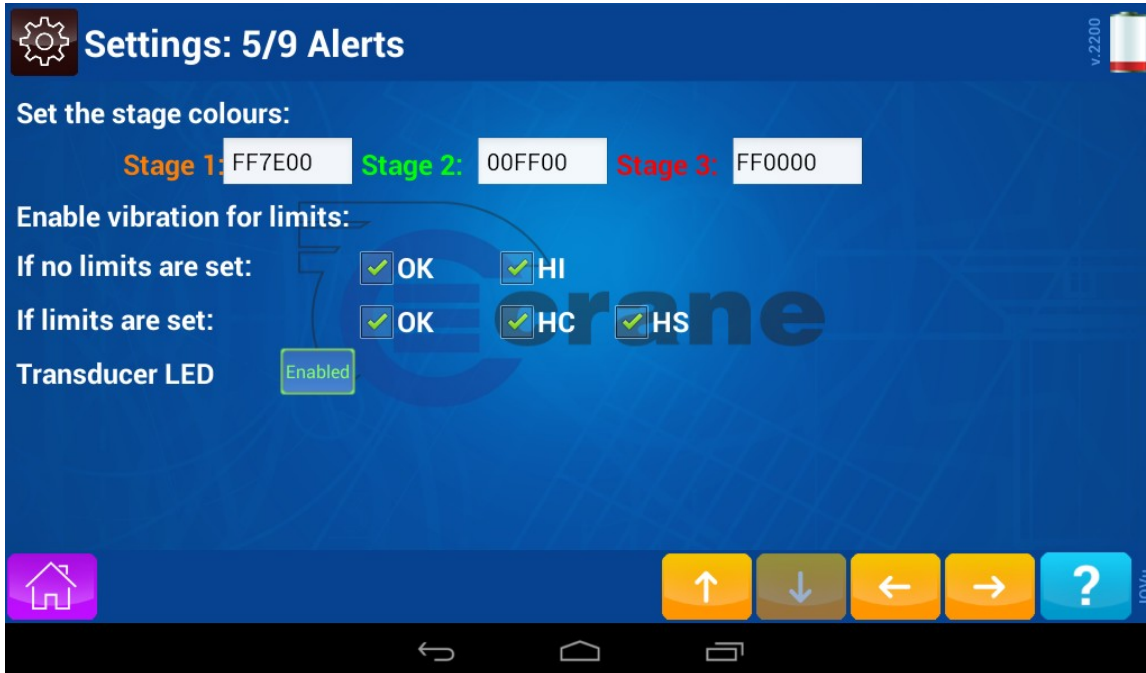
All settings on page 4 are reserved for future use and should not be changed.





SETTINGS

Please see appendix E for colour chart.



Settings: 5/9 Alerts

Set the stage colours:

Stage 1: FF7E00 Stage 2: 00FF00 Stage 3: FF0000

Enable vibration for limits:

If no limits are set: ☒ OK ☒ HI

If limits are set: ☒ OK ☒ HC ☒ HS

Transducer LED ☒ Enabled

Navigation buttons: Home, Up, Down, Left, Right, Help

Audible alerts can be configured for the various conditions within a measurement cycle. Each condition listed can have a sound file assigned to it. Sound files must be chosen from the preinstalled list as available in the drop down boxes.



Settings: 6/9 Alerts 2

Change the sound files for each Limit

No Limits Set		Limits Set	
LO	pluk.mp3	LS	pluk.mp3
OK	pluk.mp3	LC	pluk.mp3
HI	pluk.mp3	OK	pluk.mp3
		HC	pluk.mp3
Targeting	ping.mp3	HS	pluk.mp3

Navigation buttons: Home, Up, Down, Left, Right, Help



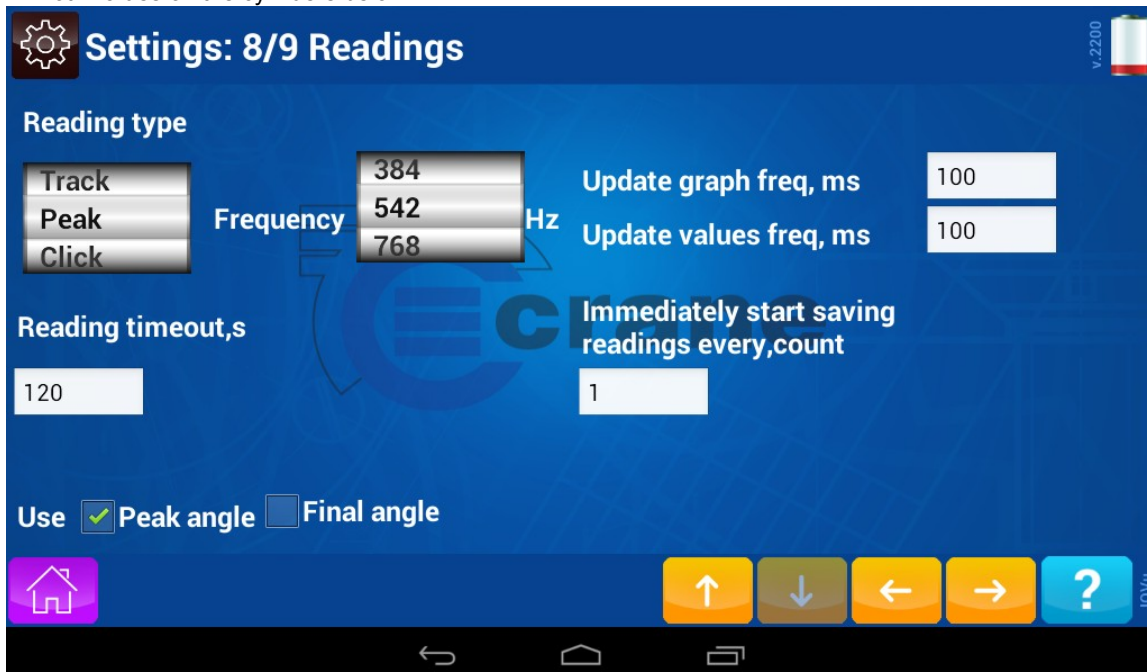
SETTINGS

IQVu can be configured to accept reading data from a tool control via Open Protocol. In order to do this IQVu must have a valid wifi network connection on the same network as the controller.



Functionality for capturing tool controller readings is reserved for future use.

Default values for frequency response on a by measurement mode basis can be configured by selecting Both values on the cylinders below.

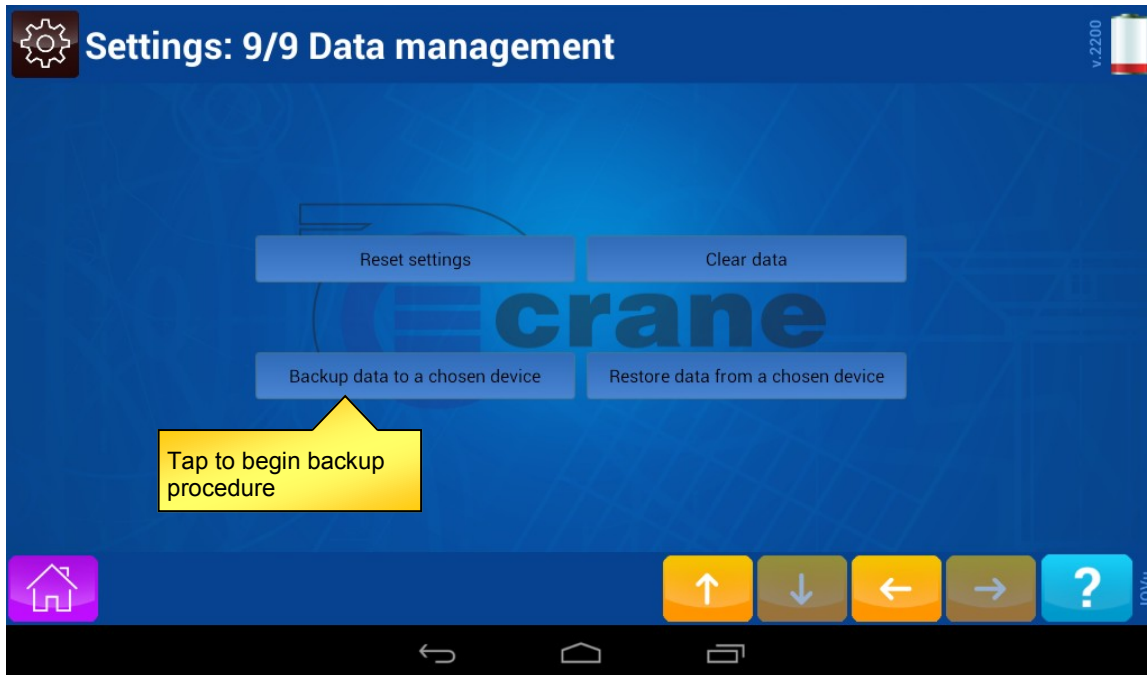


Tap the check box(s) to include "Peak" and/or "Final" angle. Please see Appendix G for details.

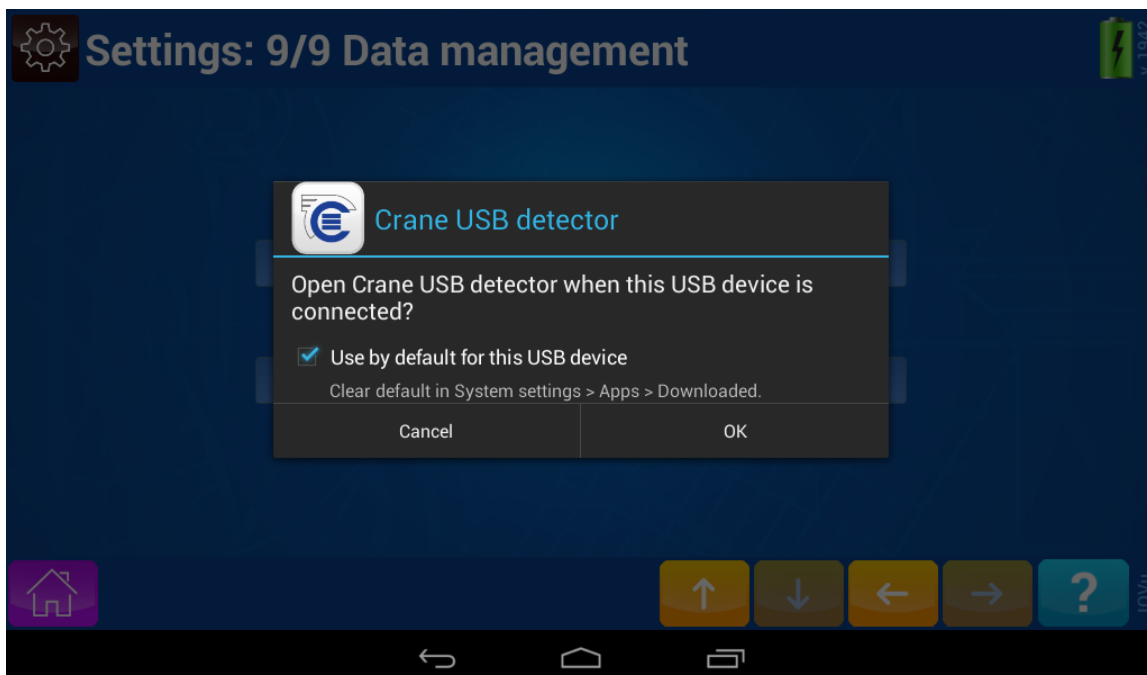


SETTINGS

The IQVu features a backup and restore feature which can be used to protect data and/or transfer to a different unit.



Insert a USB stick into the USB client connector or SD card into the SD card slot see “Controls and Connections” in this manual for further details.

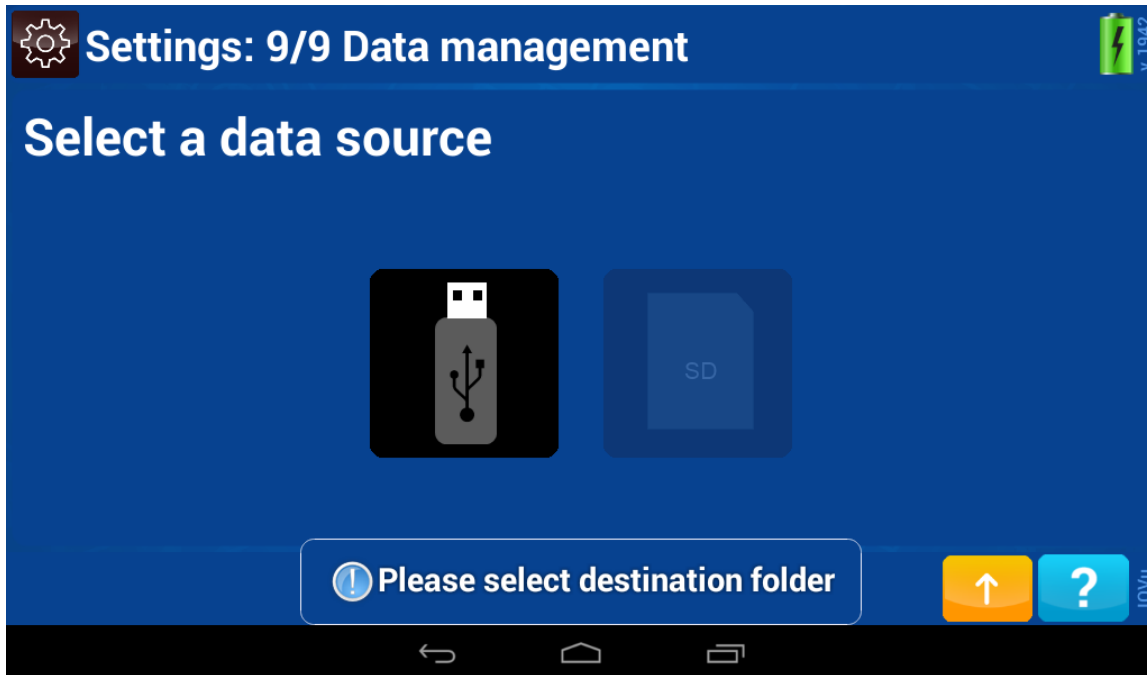


When the IQVu detects a USB stick ensure the check box is ticked and tap OK to accept.



SETTINGS

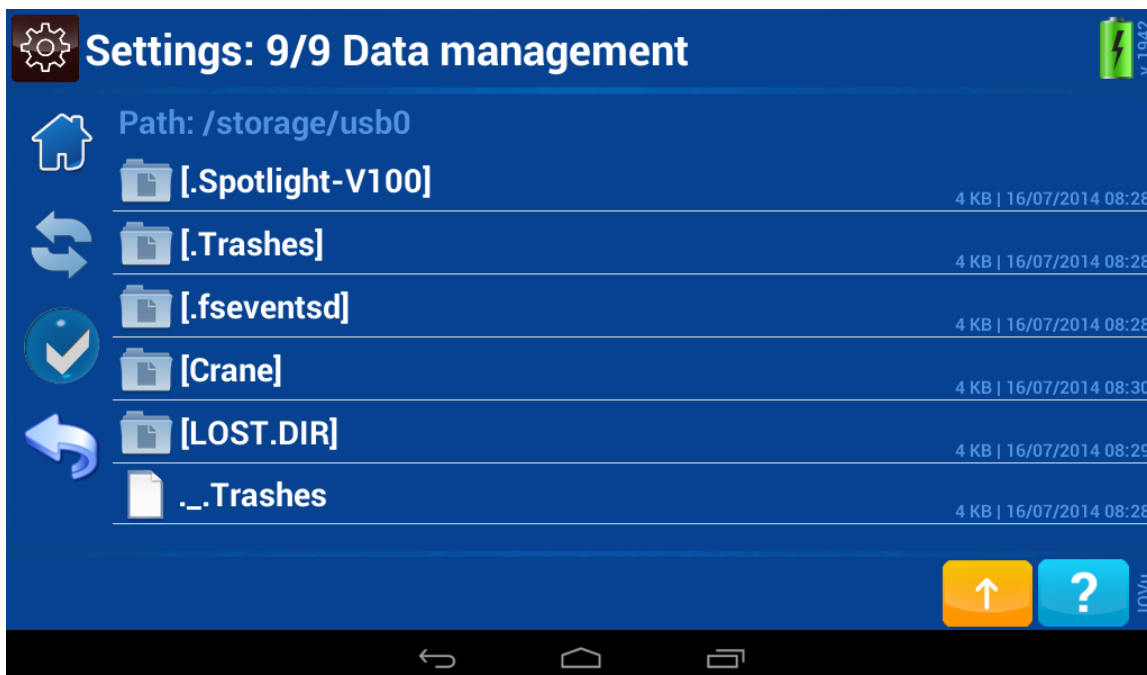
When a valid data source is present the corresponding icon will become active. Simply tap on which source is preferred to save the backup to.



When a backup is performed, if not already present, a new folder “Crane” will be created.



TIP If the Crane directory already exists, do not tap to select it. Doing so will create a new Crane folder within the existing one.





APPENDIX A

Users

The table below shows the permissions granted to the available user types.

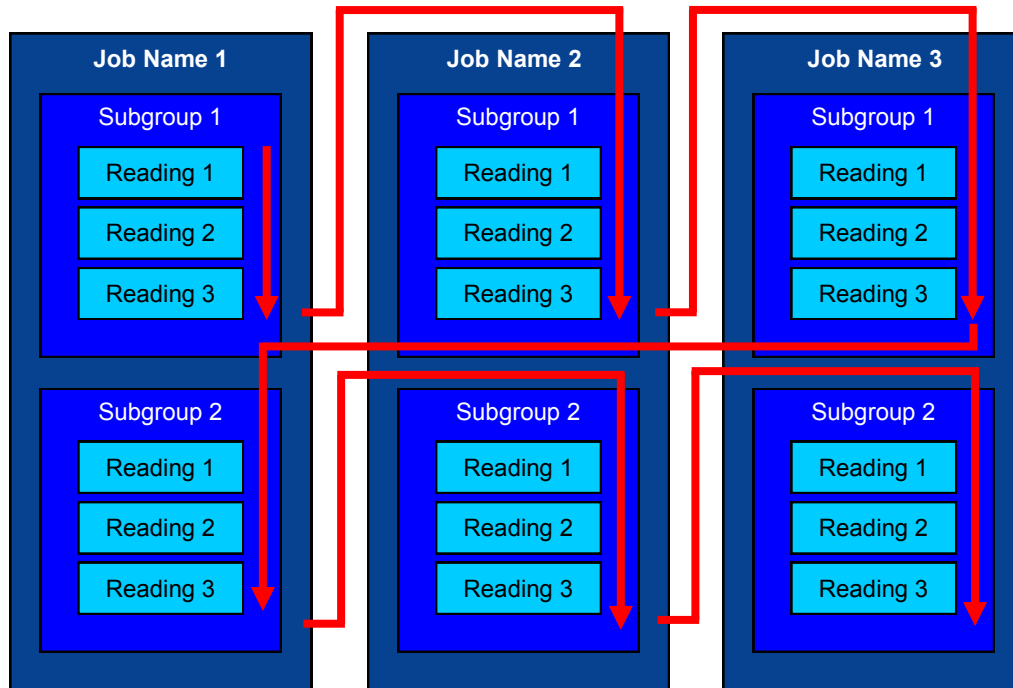
Feature	Admin	Team Leader	User
Close App (Power)	Yes		
Users	Yes		
Settings	Yes		
Edit Check	Yes	Yes	
Edit Job (include adding work instructions)	Yes	Yes	
Backup and Restore	Yes		
Measure	Yes	Yes	Yes
Reports	Yes	Yes	Yes
Statistics	Yes	Yes	Yes
Export	Yes	Yes	Yes
Attach Comment to Reading	Yes	Yes	Yes



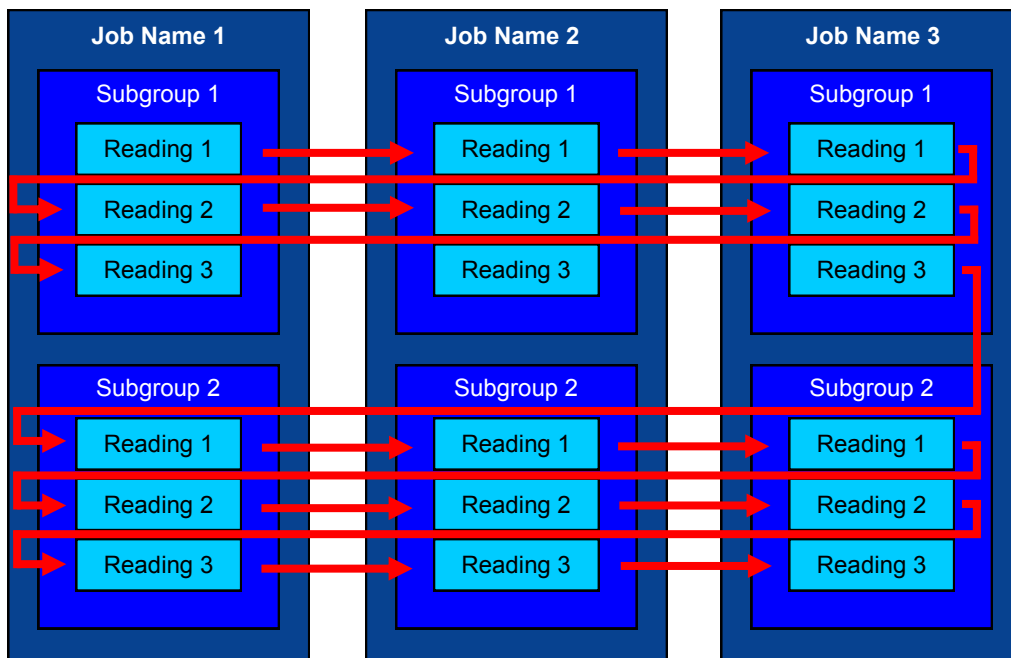
APPENDIX B

Rounds

The flow diagram below shows the order of reading entry when a Round is configured as Vertical



The flow diagram below shows the order of reading entry when a Round is configured as Horizontal





APPENDIX C

Each IQVu screen has a help icon



Help pages are tailored to the current page and will provide and icon descriptions as the example shows.

Help



Check

Navigation:

 Go to Main Menu

 Add Job

 Transducers

 Command Log
(Administrator only)

 Data Log
(Administrator only)

 Statistics

Measurement:

 Peak

 Click

 Pulse

 MoveOn

 Yield

 Track

 Torque Being Measured

 Torque Not Being Measured

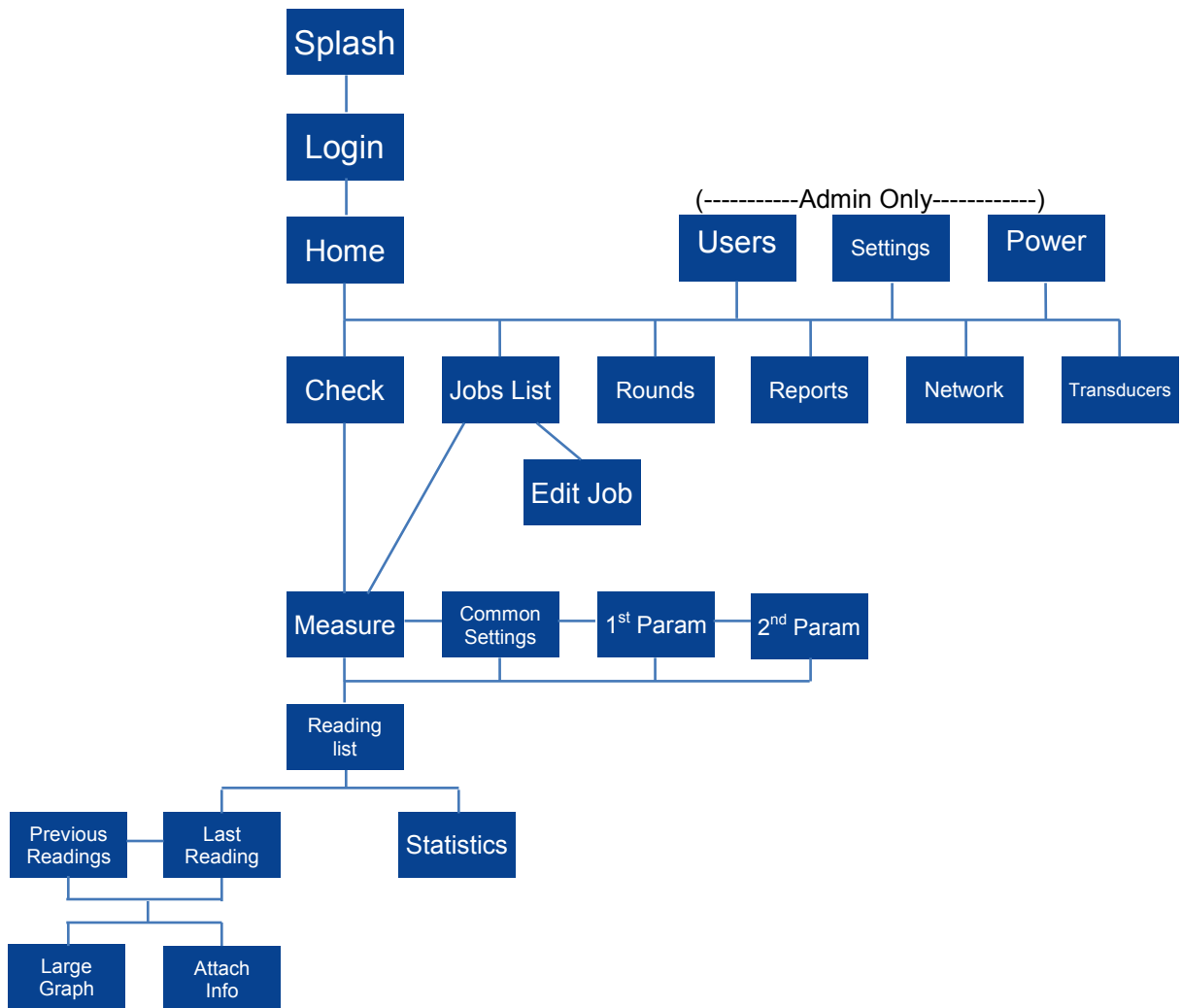
Application:

 Battery Status



APPENDIX D

Below shows the screen map of the IQVu app.





APPENDIX E

Below provides a colour reference palette for setting the visual alerts in IQVu

FFFFFF	000000	333333	666666	999999	CCCCCC	CCCC99	9999CC	666699
660000	663300	996633	003300	003333	003399	000066	330066	660066
990000	993300	CC9900	006600	336666	0033FF	000099	660099	990066
CC0000	CC3300	FFCC00	009900	006666	0066FF	0000CC	663399	CC0099
FF0000	FF3300	FFFF00	00CC00	009999	0099FF	0000FF	9900CC	FF0099
CC3333	FF6600	FFFF33	00FF00	00CCCC	00CCFF	3366FF	9933FF	FF00FF
FF6666	FF6633	FFFF66	66FF66	66CCCC	00FFFF	3399FF	9966FF	FF66FF
FF9999	FF9966	FFFF99	99FF99	66FFCC	99FFFF	66CCFF	9999FF	FF99FF
FFCCCC	FFCC99	FFFFCC	CCFFCC	99FFCC	CCFFFF	99CCFF	CCCCFF	FFCCFF



APPENDIX F

Cp

This is a capability index which shows the process capability potential but takes no account of how centred the process is. Cp is used for capability studies and may range in value from 0 to infinity. A large value indicates greater potential capability and a value of 1.33 or greater is generally desirable.

$$C_p = \frac{USL - LSL}{6\left(\frac{\bar{w}}{d_2}\right)}$$

Cpk

This is an index which indicates whether the process will produce units within the tolerance limits. If the process is centred on the nominal value then CpK will have a value equal to Cp. For values of CpK between 0 and 1 then some of the 6 sigma spread will fall outside tolerance limits but for values greater than 1 these will all be within tolerance. A negative value of CpK indicates that the process mean is outside tolerance limits. A value of 1.33 or greater is desirable.

The Lesser of:

$$C_{pk} = \frac{USL - \bar{\bar{x}}}{3\left(\frac{\bar{w}}{d_2}\right)}$$

$$\text{or } \frac{\bar{\bar{x}} - LSL}{3\left(\frac{\bar{w}}{d_2}\right)}$$

d2

Is derived from a look up table as below

Number of samples per sub-group	d2*	Number of samples per sub-group	d2*
2	1.128	17	3.588
3	1.693	18	3.64
4	2.059	19	3.689
5	2.326	20	3.735
6	2.534	21	3.778
7	2.704	22	3.819
8	2.847	23	3.858
9	2.97	24	3.895
10	3.078	25	3.931
11	3.173	26	3.965
12	3.258	27	3.999
13	3.336	28	4.032
14	3.407	29	4.064
15	3.472	30	4.095
16	3.532		

$\bar{w}$

Is the Mean average of the Subgroup Ranges

$\bar{\bar{x}}$

Is the Mean average of the Subgroup Mean averages

σ

(Standard Deviation)

Is a measure of the variation of the samples of a statistical group. If a group of n values has a mean of x then its standard deviation is given by;

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$



APPENDIX F

Cm :

This is a capability index which shows the machine capability potential but takes no account of how centred the process is. Cm is used for capability studies and may range in value from 0 to infinity. A large value indicates greater potential capability and a value of 1.33 or greater is generally desirable.

$$Cm = \frac{USL - LSL}{6\sigma}$$

Cmk

This is an index which indicates whether the process will produce units within the tolerance limits. If the process is centred on the nominal value then Cmk will have a value equal to Cm. For values of Cmk between 0 and 1 then some of the 6 sigma spread will fall outside tolerance limits but for values greater than 1 these will all be within tolerance. A negative value of Cmk indicates that the process mean is outside tolerance limits. A value of 1.33 or greater is desirable.

The Lesser of:

$$Cmk = \frac{USL - \bar{\bar{x}}}{3\sigma}$$

$$\text{or} \quad \frac{\bar{\bar{x}} - LSL}{3\sigma}$$



APPENDIX G

Industry Standard Transducer (I/S)

Type of transducer, with no pre-amplifier or coding links, but with the exact rated torque, marked on the body.

Job

Specification of one particular torque value to be collected.

USL Value

Upper Specification Limit of any reading. This can equal but not exceed the torque rating of the transducer to be used.

LSL Value

Lower tolerance level of any reading. This value MUST be greater than threshold

Round

A sequence of Jobs to be collected either horizontally or vertically. Each round has a name of up to 14 characters, 8 if downloaded from the PC.

Sub group

Grouping of samples to enable analysis, with an allowable range of 1 - 50.

Threshold Torque Value

Level of torque, which a signal must rise above and then fall below, to be considered a valid torque cycle. The minimum value is 1% of rated span of transducer.

Units of Measure

It is possible with IQVu to read a transducer calibrated in say Nm, and convert internally to display and store in any of the other torque units.

UTA Tx

Family of torque transducers which Crane products can identify by onboard EEPROM.

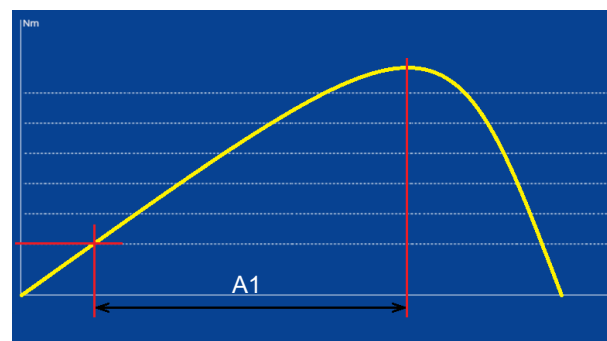
UTA Tx ID

Specification of transducer by rating in preselected units. Used as an identity or 'name'.

Peak Angle

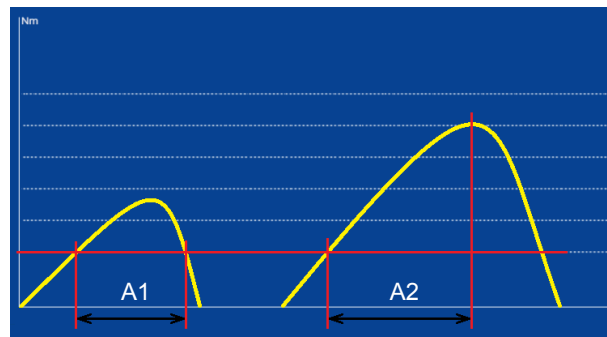
Summation of all angle measurements taken above second parameter threshold from first time above threshold until the peak torque within a given cycle.

Ex. 1



Peak Angle = A1

Ex. 2



Peak Angle = A1 + A2

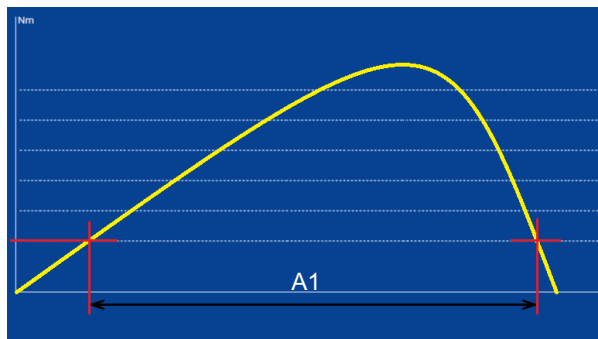


APPENDIX G

Final angle

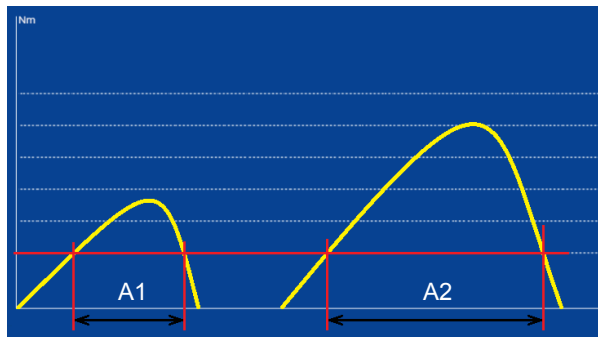
Summation of all angle measurements taken above second parameter threshold from first time above threshold until final time below second parameter threshold within a given cycle.

Ex. 1



Final Angle = A1

Ex. 2



Final Angle = A1 + A2