ACCU-GOLD TOUCH

USER GUIDE

(For use with all Accu-Gold Touch Models)

Radcal®

Introduction

The Accu-Gold Touch is the next generation X-ray measurement system at the heart of which is a compact multifunction digitizer module and powerful, intuitive firmware. Accu-Gold Touch with its built-in display is a compact, cost effective, and multi-function X-ray analyzer and uses the latest technology in solid state sensors, gold standard ion chambers, mA, and light sensors.

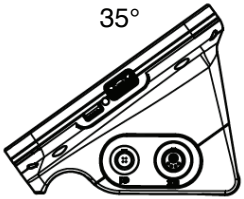
Accu-Gold Touch has features to increase your productivity such as: quick setup, ease of use, automatic settings and multiple-parameter data capture, unique remote operation, easy data analysis, and instant data recall. With an Auxiliary sensor input and customizable software, you have the capability to expand to meet future needs. The Accu-Gold Touch provides the ability to save all of your measurements.

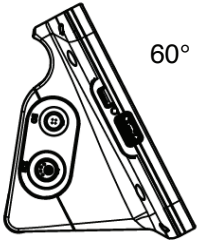
The Accu-Gold Touch system consists of a built-in digitizer module whose function is to transform the analog signals generated by a host of sensors into calibrated digital signals. The Touch is available in different models that are suited for specific applications, the differences being which sensors can be used.

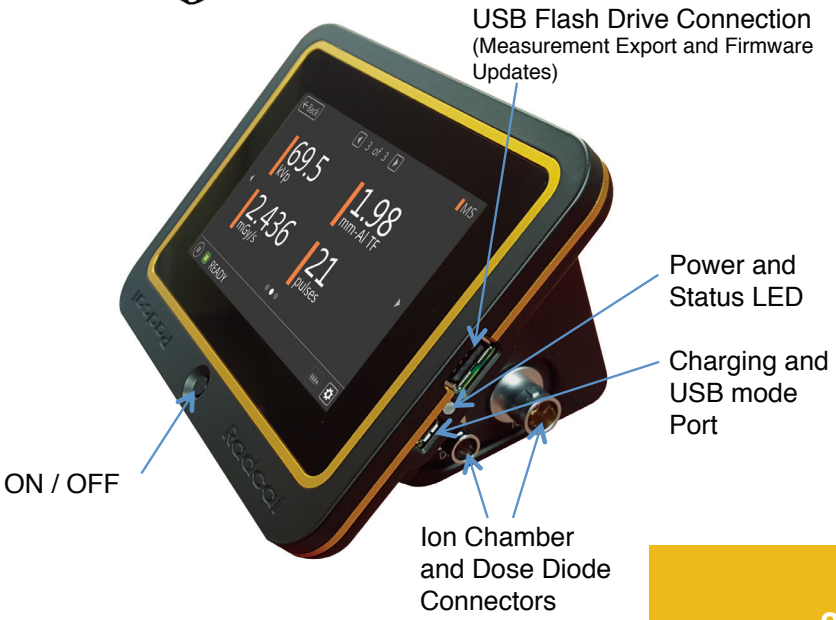
System Configuration Options and Capabilities

Model Number	Accu-Gold+ Touch AGT–AG	Accu-Gold+ Touch Pro AGT–P–AG	Rapid-Gold+ Touch AGT–RG	Rapid-Gold+ Touch Pro AGT–P–RG	Accu-Dose+ Touch AGT–AD	Accu-Dose+ Touch Pro AGT–P–AD
Standalone Operation	X	X	X	X	X	X
AG2 USB Connection		X		X		X
AG2 Wireless Connection		X		X		X
AG2 Excel Companion		X		X		X
Accu Gold Excel USB		X		X		X
IOS/Android (BETA)		X		X		X
Sensor Options						
AGMS - D+	X	X	X	X		
AGMS - M+	X	X	X	X		
AGMS - DM+	X	X	X	X		
Ion Chamber	X	X			X	X
Dose Diode	X	X	X	X	X	X
mAs Sensor	X	X	X	X		
Light Sensor	X	X				

The Accu-Gold Touch can be used at two different viewing angles



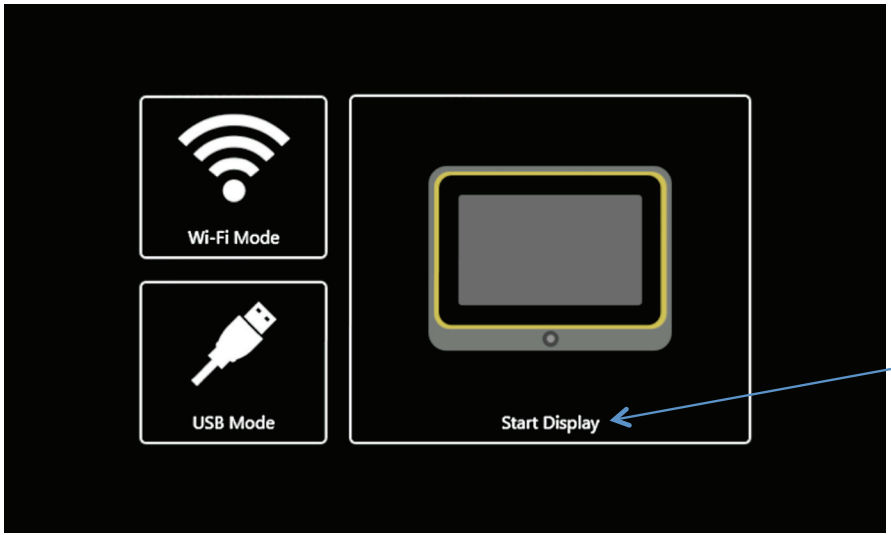




Standalone Operation

The Accu-Gold Touch can be used like a traditional handheld meter with an easy to use interface.

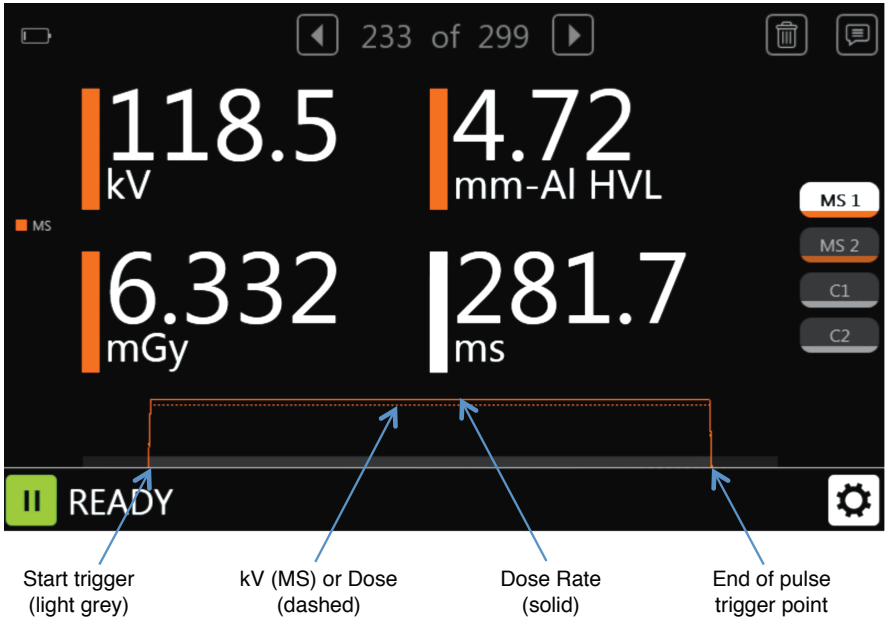
The “Pro” version will have a starting menu to be able to also use the Touch in USB and WiFi modes.



On the start screen click "Start Display". The measure window will automatically be loaded.

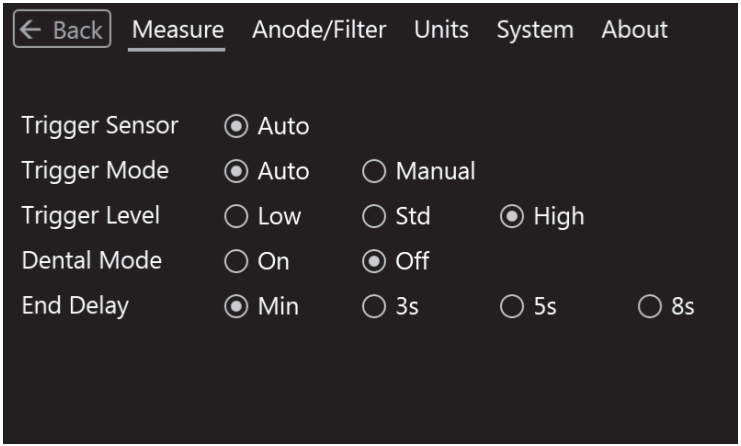
Four outputs can be viewed on the display at one time:

Waveforms –


233 of 299
118.5
kV
4.72
mm-Al HVL
MS
6.332
mGy
281.7
ms
MS 1
MS 2
C1
C2
READY
Start trigger (light grey)
kV (MS) or Dose (dashed)
Dose Rate (solid)
End of pulse trigger point

Settings – 

Measure –



Trigger Sensor: Chosen automatically. If more than one sensor is plugged in, it will trigger off of the multisensor. If no multisensor, then the dose diode. If neither, then the ion chamber. The sensor used for triggering will be indicated on the Exposure Info panel for that measurement (see pg 5).

Trigger Mode: Manual trigger disables the trigger and lets you start and stop a measurement by pressing a button.

Trigger Level: "Std" trigger sensitivity is recommended. Select "Low" if "Std" is not low enough. "Low" may allow smaller signals to be captured, but may also result in false triggers. Select "High" if "Std" causes false triggering.

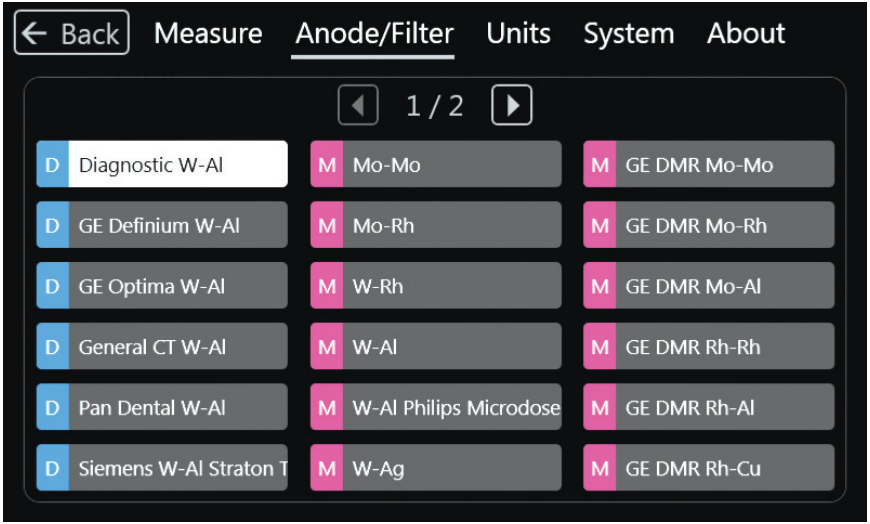
Dental Mode: Designed to accommodate the initial pre-heat kV pulses commonly found with some dental generators. The dose remains integrated over the entire exposure and only the kV and time calculations are affected.

End Delay: Many modern x-ray generators now feature scout exposures which may introduce gaps of several seconds or more in the radiation output. In some instances, if the end of exposure delay is not long enough Accu-Gold may attempt to display the exposure results while the generator is finishing the exposure. If this situation is encountered, you may select an end of exposure delay of up to 8 seconds. The dose remains integrated over the entire exposure and only the kV and time calculations are affected. The scout pulse will be ignored in the Dose Rate calculation.

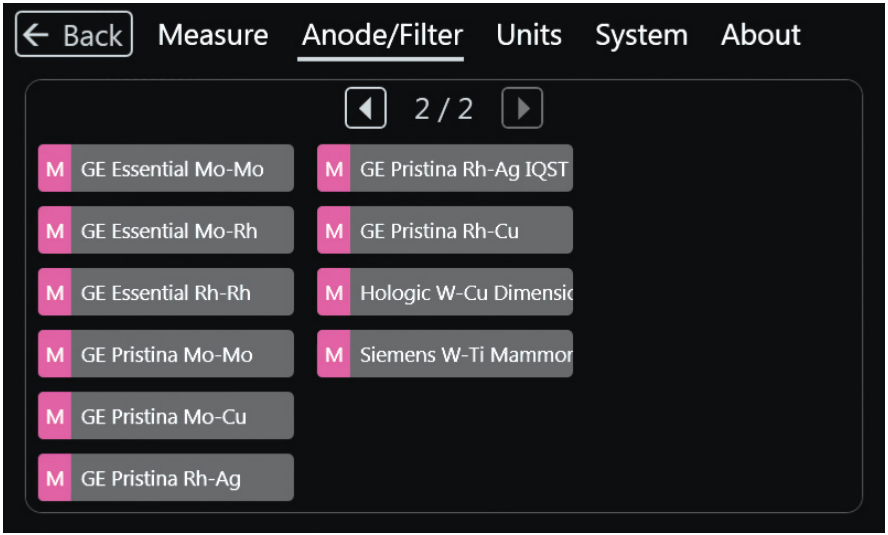
Anode/Filter Calibrations Available –

Anode/Filter –

The anode filter calibrations that are available for making measurements will depend on the multisensor you use. A diagnostic multisensor will only show the diagnostic calibrations, an ion chamber will show none. Some calibrations require that the multisensor have a particular built in calibration and will only show up if that is the case. Chose the calibration appropriate for the machine you are measuring.



Anode/Filter Calibrations Available – (continued)

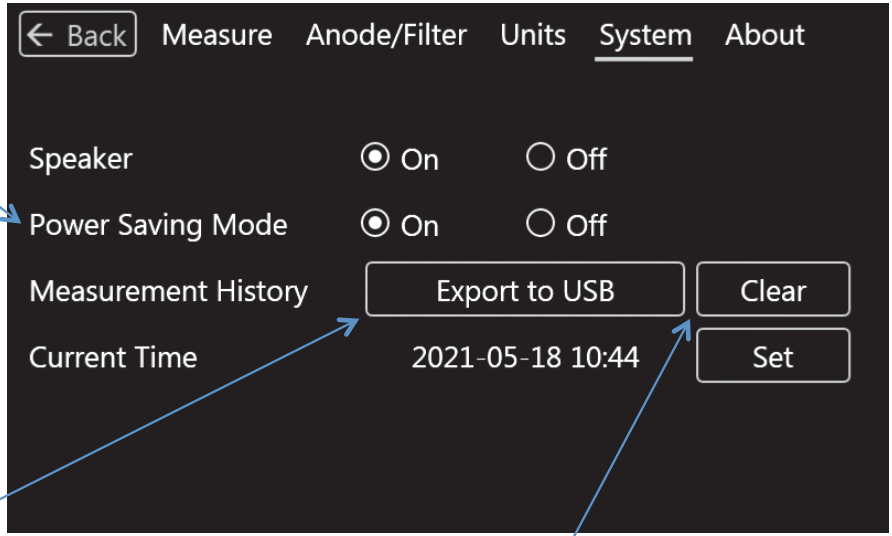


System –

Screen dims after 30 seconds of inactivity. Touching screen or making a measurement restores it. Unit powers off after 5 minutes.

Measurements may be exported to a USB flash drive and can be viewed using Accu-Gold 2 software (V2.46 or later). Copy the exported file to a PC with AG2 on it. Double-click this file and it will open in the AG2 software.

The Touch only shows the last 300 measurements but will export all of its measurements breaking up the files into sessions.
(A session is all the measurements between the time the Touch is turned on and then turned off.)

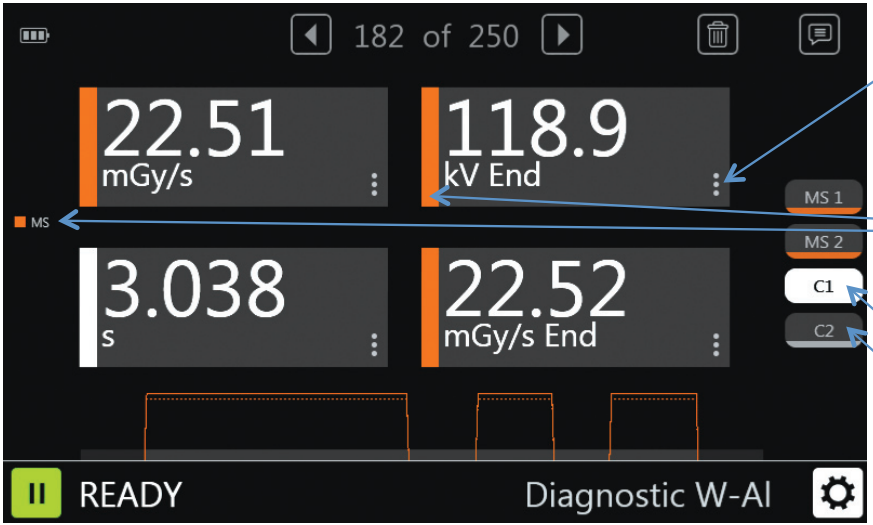


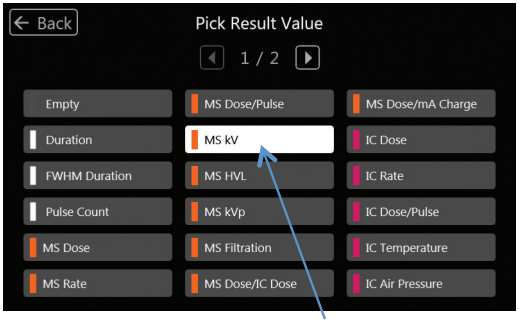
Clear – erases all measurement history

Measurement Results Customization –

The Measurement Results on the customizable pages, C1 and C2, can be customized to show any output on either page. Multiple sensors can be combined on a single page showing the results of interest without having to change pages.

Touch any measurement result. A page opens up that lets you replace the result shown with another. Choose the one you want and then press **Back**.





Indicates customizable

Measurement result choices

Color coding indicates the source of the measurement (see page 5).

Customizable pages

Measurement Output Selection –

This table shows on which screen the output will be shown.

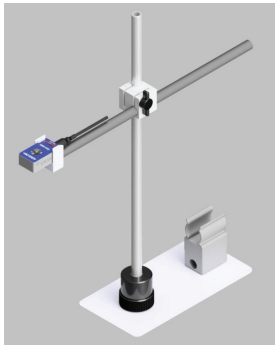
Value	Screen*	Definition
Digitizer		
Air Pressure		The atmospheric corrections compensate for the effects of variations in the current temperature (T in C) and pressure (P in kPa) on an unsealed ion chamber and uses the following equation: Displayed value = (101.3/P) * ((T + 273.15)/295.15) * Instrument value
Duration	MS1 IC DD DAP DAPChk	Exposure duration from start to stop trigger. If pre-pulse detection was activated, duration is the duration of the main signal without pre-pulse.
FWHM Duration		Full-Width at Half-Maximum duration. The width of the time interval within which the signal is at least half the peak signal.
Pulse Count	MS2 IC DD DAP DAPChk	Measurement pulse count.
Multi-Sensor		
Dose	MS1	Dose Integral
Dose / mAs	mA	Dose / mAs
Dose / Pulse		Dose / Pulse
Dose Rate	MS2	Dose Rate
Dose Rate Max		Maximum dose rate encountered
Dose Ratio AGMS / IC		Multi-sensor dose divided by ion-chamber dose
Filtration	MS2	Measured beam-filtration thickness.
HVL	MS1	Half value layer result.
kV	MS1	kV average
kVp	MS2	Average peak voltage
End Average kV		END is useful for capturing the radiation values at the end of an exposure. For exposures longer than 100 ms, and less than 1 second, END captures the last 15% of the exposure. For exposures longer than 1 second, END captures the last 1 second. End ignores the last 5 ms when calculating the values.
End Dose Rate		
End Filtration		
End HVL		

** Any of the outputs can be shown on screens C1 and C2.*

Measurement Output Selection – (continued)

Value	Screen*	Definition
Ion Chamber		
Dose	IC	Dose Integral
Dose / Pulse		Dose / Pulse
Dose Rate	IC	Dose Rate
Dose Rate Max		Maximum dose rate encountered
Temperature		Temperature measured by ion chamber
End Dose Rate		(See AGMS END))
Dose Diode		
Dose	DD	Dose Integral
Dose / Pulse		Dose / Pulse
Dose Rate	DD	Dose Rate
Dose Rate Max		Maximum dose rate encountered
mA Sensor		
Charge	mA	The sum of mA values during the region of interest is the value of mAs.
Current	mA	Average mA is mAs divided by the width of the region of interest.
Charge/Pulse	mA	
Light Sensor		
Illuminance	LS	Measured illuminance
Luminance	LS	Measured luminance with luminance adapter
DAP Chamber		
DAP	DAP	Dose Area Product
DAP Rate	DAP	DAP Rate
DAP/Pulse		DAP per pulse
DAP Temperature		Temperature of the DAP sensor
DAPChkp+		
DAP	DAPChk	Dose Area Product
DAP Rate	DAPChk	DAP Rate
Temperature		Temperature of the DAP sensor
End Dose Rate		(See AGMS END))

Setting up the Hardware



1. Connect the sensor(s) to the Touch.
2. Position the sensor to make a measurement.

Note: Position the sensor before pressing the Play button; moving the sensor or cable while it is measuring may trigger a false measurement.

3. Place the sensor in the path of the X-ray beam.

Note: Make sure the temperature of the ion chamber (if used) has stabilized before making a measurement.

4. Press the Play button.
5. The firmware begins to initialize the hardware as indicated by the status at the bottom of the screen. If an ion chamber is connected, the bias supply needs to start and stabilize.
6. As soon as the “READY” message is displayed at the bottom of the screen, you can make a measurement.
7. Activate the X-ray machine to capture the exposure data.
8. The Touch automatically saves and displays the data for the measurement when the exposure is complete.
9. At any time you can review outputs of the current measurement or previous measurements. Make additional exposures as necessary.

Note: All measurements are automatic (except for Manual Trigger Mode) until you press the **Pause** button.

10. If you need to reposition the sensor(s), click the **Pause** button to temporarily take the sensor offline and prevent any inadvertent null exposures from being added to your measurements.
11. Click the **Play** button when you are ready to make your next measurement.

Measurements Using Solid State Mammographic Sensors

Before making an exposure, make sure to choose the Anode/Filter combination that best represents the machine being measured (see page 8 & 9). Radcal sensor calibrations assume a 2.2 mm polycarbonate paddle, or simulated paddle (Model 8154), is placed on top of the sensor.

Making a Measurement with multiple sensors connected

The Accu-Gold Touch allows you to connect up to five sensors (depending on model) simultaneously and collect data from all of the connected sensors.

Battery Charger

The battery icon on the display indicates an approximate state of charge. When the battery level drops to approximately to 25%, the LED will start to blink green/red (or blue/red in WiFi mode).

The charger that is supplied with the Touch has been chosen to optimize the charging of the battery. Typical charging time for a fully drained battery is approximately 5 hours.

The LED shows yellow (magenta in WiFi mode) when the charger is plugged in. Blinking means that it is charging, solid when complete. The Touch can be used while being charged and the charger may be left connected indefinitely.
If the battery has been exhausted, there will be a small delay while it charges up enough to operate.

The Touch can be charged using other chargers or even using the USB port of a computer but the charging time may vary depending on the source and how it is recognized.

USB Flash Drive

Firmware updates will be provided from time to time. In order to install an update, using the link provided, download the files onto the flash drive. Additional instructions will be provided at that time.

CAUTION
Do not dispose of product in heat, fire or water. Misuse, dropping, or excessive force may cause product damage.

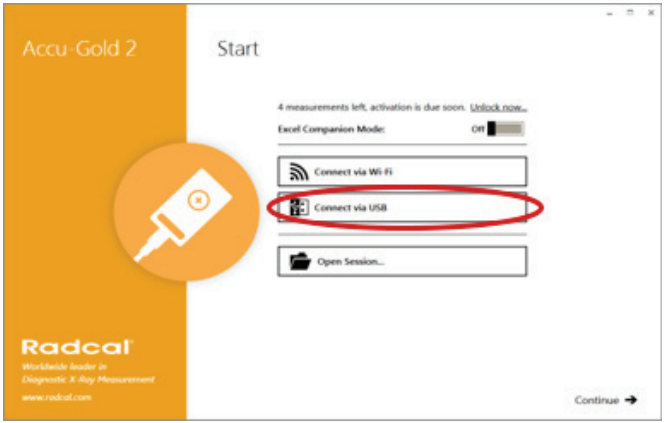
USB Mode - Using Accu-Gold 2 software

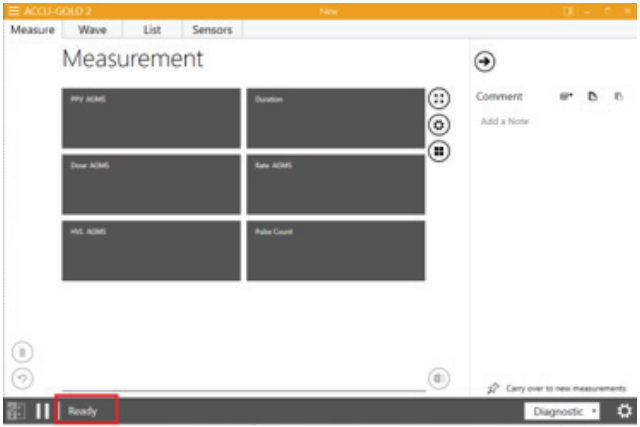
Connect the control unit to a PC using the supplied micro USB cable (or use a standard USB-A to USB-B micro cable) and attach any sensor that you would like to measure with. The maximum USB cable length is 3 meters. You can use a 5 meter cable but you may experience interference issues in some cases. Over 5 meters requires using an active extension (contact Radcal).

Launch Accu-Gold 2 on you computer and select "Connect via USB" on the Start screen.

Refer to the Accu-Gold 2 User Manual when in USB or WiFi Modes.

When the software displays the "Ready" status in the lower left corner of the window you can begin measuring.





WiFi Mode - Using Accu-Gold 2 software

Power on the control unit and select "Wifi Mode" on the start screen then click "Start Wi-Fi"

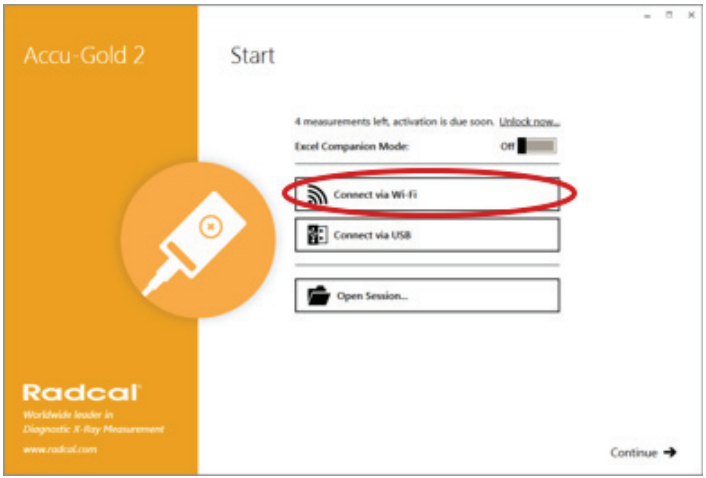
The Display on the control unit will go blank, when the Blue LED blinks rapidly it is ready to connect. Launch Accu-Gold 2 and select "Connect via Wi-Fi" on the start screen. When the software displays "Ready" you can begin to measure.

If the connection fails, go to the windows connection manager and select TouchXX-XXXX and click connect.

If a PIN is requested click the underlined text below "Connect using a security key" and enter 12345678 for the password. Once connected the status will be "No Internet, Secured".

You can now click the "Start" button on the measurement screen and standby for initialization.

When finished, turn off the unit. There might be a delay before the LED goes out.



Accu-Gold Touch Specifications --

Display Specifications
Resolution: 800 x 480
Touch Type: Capacitive Touchscreen
Type: LCD TFT TN equipped with chemically tempered float glass, pencil hardness 7H, LED backlighting
Orientation: Automatically flips based on screen orientation

Environmental Specifications
Operating temperature: 15 °C to 35 °C
Pressure: 60 to 105 kPa
Humidity: Up to 80% RH or 20 g/m^3
Storage: Temperature 0 °C to +60 °C

USB ports
Flash drive: Standard USB A 2.0
Charger/USB mode (Touch Pro): Standard USB B 2.0 micro

Wireless Communication Specifications (Touch Pro)
Network Standard Support: IEEE 802.11b/g/n
Frequency band: 2.400 - 2.472 Ghz, channels 1-11
Antenna power: <10 mW/MHz
Connectivity: Access Point mode
Wireless Security: WPA2 secure encryption
Networking Protocol: TCP
Regulatory Approvals: EU (ETSI), FCC, IC (Industry Canada), Japan (Telec)

Power Specifications
Battery: 5.5 Ah Li-Poly (single-cell)
Battery Life: > 8 Hours under normal usage
Charging Time: <5.5 Hours (maximum to fully recharge)
Charger: Radcal part number PRS/PSA10F-050 (5V, 2.0A)
Input: 90 to 264 VAC, 47 to 63 Hz
AC power supply blades (international kit) PRS/PSA10F-Q (D)

Compliance (see https://radcal.com/downloads-conformity/ for Declaration or Conformity)
The Accu-Gold Touch Basic and Pro models conform to ISO/IEC/UKCA requirements: Electromagnetic Compatibility Regulations, Electrical Equipment (Safety) Regulations, the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations, EMC Regulations (compliance limited to 3m USB cable).
Performance: IEC 61674, IEC 61676

Environmental Directives:
1. Radcal meets the requirements of the 2002/06/EC (WEEE) Directive, catagory 9, and has implemented full compliance. (Manuals are available on request.)
2. Radcal meets the requirements of the 2015/863/EU (RoHS3) Directive.
3. The Accu-Gold/Rapid-Gold/Accu-Dose+ comply with China RoHS marking and EFUP persuant to clause 6.2 of SJT/11364:2006 for Electronic Information Products.
4. Radcal meets the requirements of the EC1907/2006 (REACH) Directive.

Warranty for the Accu-Gold Measurement System

Radcal Corporation warrants that, in the event that any defects in material or workmanship should develop within one year of the date of shipment, the company assumes full responsibility for servicing equipment of its manufacture without charge upon return of the equipment to Radcal, with shipping costs prepaid by the customer. Costs to return-ship to customer by ground transportation will be paid by Radcal if the repairs are warranty-applicable. This warranty excludes batteries.

Radcal shall not be held liable for damages or delays caused by defects beyond making repairs or furnishing replacement parts, nor shall Radcal be liable for any defective material replaced without Radcal's consent during the period of this warranty. Radcal reserves the right to perform warranty services at its own factory.

Non-Warranty Repairs

The calibration of this instrument was correct within specified limits when the instrument left our factory. Radcal cannot be responsible for injury or damage resulting from improper use or calibration errors which develop subsequent to our shipment of the instrument.

If Radcal determines that a fault has been caused by misuse, abnormal operating conditions, or repairs by unauthorized personnel during the warranty period, repairs and shipping costs will be billed at normal rates.

If the equipment is found to be in proper working condition, Radcal will return-ship the equipment at customer expense.

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Radcal Part # MNL/AGTQS
4094382 REV: H
Firmware V1.60 & on
Printed: May 2021

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