



QA BEAMCHECKER PRO™

REF 90503

U S E R M A N U A L

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General Precautions

Warnings and Cautions alert users to dangerous conditions that can occur if instructions in the manual are not obeyed. Warnings are conditions that can cause injury to the operator, while Cautions can cause damage to the equipment.



WARNING: Proper use of this device depends on careful reading of all instructions and labels.



WARNING: Electrical shock hazard when connected to 300 V bias supply. Do not disassemble the QA BeamChecker Pro.



WARNING: Where applicable, Standard Imaging Products are designed to be used with the versions of common radiation delivery devices, treatment planning systems and other Products or systems used in the delivery of ionizing radiation, available at the time the Standard Imaging Product is released. Standard Imaging does not assume responsibility, liability and/or warrant against Problems with the use, reliability, safety or effectiveness that arise due to the evolution, updates or changes to these Products or systems in the future. It is the responsibility of the customer or user to determine if the Standard Imaging Product can be Properly used with these Products or systems.



WARNING: All service must be referred to Standard Imaging or Authorized Service personnel only.



WARNING: Before using the QA BeamChecker Pro, the operator must ensure that the equipment is correctly connected and in Proper working condition. The user must verify the general functionality, safety, and duty condition of the device, the data cable, and the power cord.



WARNING: The QA BeamChecker Pro is not intended to be used in flammable mixture atmospheres. Do not use with flammable anesthetic mixture with air, oxygen, or nitrous oxide.



CAUTION: Only original components should be used, and no modifications and/or alterations to the Product or any portion thereof should be performed without obtaining the prior written authorization of Standard Imaging. Unauthorized modification of the equipment will void the Product warranty.



CAUTION: This device should never be submerged in any liquid, scrubbed with an abrasive cleaner, or be stored or placed where liquids could be spilled or splashed onto it.



CAUTION: Do not drop, mishandle, or disassemble this device. Refer all servicing to qualified individuals.



CAUTION: Do not irradiate this device past the 20 x 20 cm field label edge.



CAUTION: Always use the QA BeamChecker Pro in the same orientation during Baseline Setup, Standalone, or Real-Time Operation Modes. Improper comparative measurements and/or out of tolerance fault messages will occur if used in a different orientation.



CAUTION: To help ensure measurement reproducibility over time and minimize possible backscatter effects from the treatment couch, especially for low energy photons, position the device in the same location on the treatment couch for every measurement.



CAUTION: Disconnect the cables by pulling on the connector and not the cable itself as stressing the cable may cause fire or electrical shock.



CAUTION: Before upgrading to a new version of QA BeamChecker Pro software, download any standalone data to the database.



CAUTION: Use Provided power supply or equivalent as identified by Standard Imaging. Contact Standard Imaging for additional information.



CAUTION: To ensure long-term performance of the internal battery, it is recommended to recharge the QA BeamChecker Pro by always placing it on the Power/Data Cradle or plugging it directly into the power supply when not in use.

Precautions against Ionizing Radiation



WARNING: Exposure of any part of the human body to X-rays or gamma-rays can be highly injurious to health. Whenever X-ray equipment or radioactive sources are in use, appropriate legal requirements must be applied.



WARNING: Local or national or international safety precautions when using ionizing radiation shall be strictly applied.



WARNING: This system is intended for use by qualified personnel who are trained and qualified in the operation of radiation-producing equipment.

Precautions for Electrical Safety



WARNING: This system must only be set up by qualified personnel who are familiar with the setup of electrical equipment (considering safety precautions to avoid possible injuries and damage to the system).



WARNING: The QA BeamChecker Pro is intended to operate from a power source that will not apply more than 240 Volts RMS between the supply conductors or between supply conductor and ground.



WARNING: The computer connected to the QA BeamChecker Pro via the Ethernet port and the computer monitor must be grounded through the Protection earth conductors in their respective power cords.



WARNING: The socket outlet shall be installed near the power supply and shall be easily accessible.



WARNING: To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective safety ground.



WARNING: To avoid electrical shock, plug the power cords into a properly wired receptacle before performing all other connections. For proper performance do not use receptacles which are not properly grounded.



WARNING: If the protective-ground connection is lost, all accessible conductive parts can render an electric shock, including the parts which appear to be isolated.



WARNING: Use only the original power cords. Inspect power cords and connectors regularly. Cord and connector repairs should only be serviced by qualified personnel.



WARNING: Be sure to only operate the QA BeamChecker Pro with the provided power supply. Use of an incorrect power supply will cause system failure and create a hazard.



WARNING: If any abnormal phenomena are evident such as smoke, strange sounds or fumes, unplug the power supply and contact Standard Imaging immediately. Further use may be dangerous.



WARNING: In case of an accident or malfunction, unplug the power supply immediately and contact Standard Imaging. Using the QA BeamChecker Pro or the power supply any longer may cause fire, electrical shock or other damage.



CAUTION: Do not modify this equipment without authorization of Standard Imaging. Unauthorized modification of the equipment will void the product warranty.



CAUTION: Environmental conditions that are not in compliance with this manual may cause fire, electrical shock, reduce the lifetime and/or irreparably damage the QA BeamChecker Pro and void the product warranty.



CAUTION: Disconnect the cables by pulling on the connector and not the cable itself as stressing the cable may cause fire or electrical shock.



CAUTION: Do not touch the connectors with wet hands or pull or insert the connectors with wet hands, as this may cause electrical shock.



CAUTION: High electromagnetic fields or mobile RF-communication devices near the QA BeamChecker Pro or the data cables may result in erroneous readings.



CAUTION: Connect only IEC 62368-1 or IEC 60950-1 approved devices to signal input/output connectors with voltage not to exceed 12Vpk.



CAUTION: Exterior cleaning of the device can be done with a soft brush or cloth. Turn off and unplug the power supply before cleaning. Gently brush all surfaces to remove dirt and dust. Do not permit any liquid to seep into the QA BeamChecker Pro connectors in any manner during cleaning. No sterilization of the QA BeamChecker Pro is required.



CAUTION: Cybersecurity is a shared responsibility between Standard Imaging and the customer. Secure use of this product is dependent upon the proper utilization of passwords, firewalls, networks, computer platforms, operating systems and data storage.

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1 Overview/Intended Use

The QA BeamChecker Pro (QABC Pro) is a high-end detector array with 30 air-vented and guarded parallel plate ionization chambers, a Power/Data Cradle, and analysis software used by medical physicists and radiation therapists to verify that radiation beam parameters do not change over time compared to established baselines. Use QABC Pro to establish baseline parameters for the dose output, dose constancy, axial symmetry, transverse symmetry, and flatness, then acquire and analyze daily measurements, view historical data, and report results compared to the baselines.

The QA BeamChecker Pro is equipped with a large 5.5-inch OLED touchscreen display which features a user-friendly interface for quick and efficient setup, access to device details and diagnostics, and the convenient display of measurement activities, alerts or failures.

QABC Pro includes internal memory along with automatic energy detection that allow users to operate the device as an internally comparative measurement tool that indicates to the user via visual and audible displays if a given external radiotherapy beam has deviated from its established baseline parameters. Using the device in this manner is referred to as Standalone Mode. Data acquired in standalone mode is automatically transferred to the database by either placing the device back on the Power/Data Cradle connected to ethernet, via a Wi-Fi connection, or via direct ethernet connection between the device and a computer with the web client interface, typically located in the linac console area.

The provided web-based software application features Real-Time Mode which uses either Wi-Fi or ethernet connectivity between the device and computer. Use Real-Time Mode to ready the device for measurement then automatically transfer data to the application software when beam delivery is completed. Automatic energy detection matches the measurement to its established baseline and provides a full display QA measurement results for review before saving or discarding said measurement.

The third data acquisition feature is Physics Mode using the software application. Physics Mode is used to take individual measurements with the device that may be used for troubleshooting or research purposes. Each measurement can be exported as a .csv file only. Once results are displayed, they can be exported as a .csv file only. The measurement is cleared by clicking on the Start button or navigating away from this page. Physics Mode data is not compared to a baseline nor is it stored in the database.

The QABC Pro is factory-calibrated to a known source during manufacture. The raw chamber outputs are corrected via a multiplicative factor to account for small variations in each chamber's sensitivity. The set of multipliers is stored in the device's non-volatile memory for retention between release for sale and return for repair. When a QABC Pro is returned to SI for an indicated repair, the device is 're-calibrated' and the new chamber corrections replace the previous values.

This manual describes the design elements and respective software and hardware interfaces for QABC Pro.

When not in use, the QABC Pro is stored outside of the treatment vault to reduce the amount of scattered radiation the device experiences.

1.1 Intended Use

Machine QA – The QA BeamChecker Pro is a beam analyzer measurement instrument for routine periodic quality assurance testing of conventional, rotational and/or robotic linear accelerators performance.

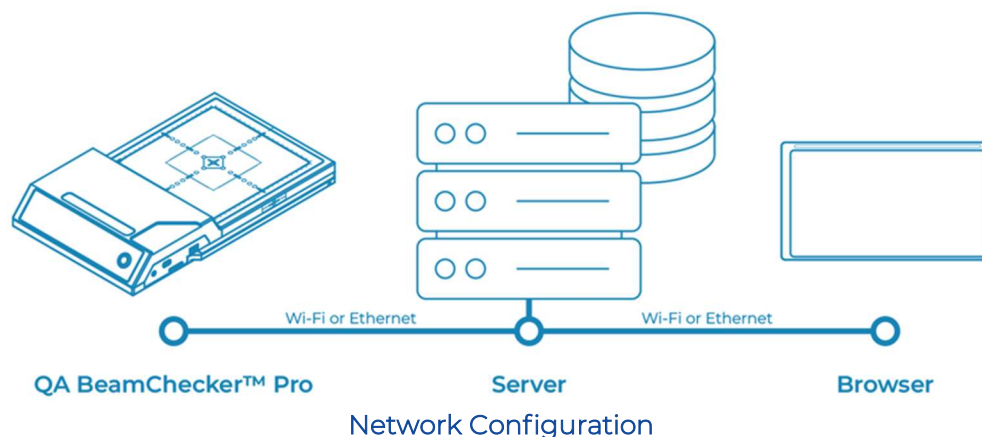
1.2 What You Should Already Know

It is assumed that the operator of the QA BeamChecker Pro is familiar with operating a touchscreen interface, a personal computer running a Microsoft Windows environment, and the standard technique for using a computer mouse. It is also assumed that the operator is a qualified medical physicist or qualified clinical radiation therapist who is aware of the dangers that can arise in high-voltage circuits and that is experienced with the use of precision electronic circuits for sensitive measurements. The operator is also assumed to have knowledge of systems used in the delivery of ionizing radiation.

Proper use of the QABC Pro and interpretation of its results are essential and are the sole responsibility of the user. Standard Imaging and its distributor companies are in no way held responsible for misuse of the QABC Pro and/or misinterpretation of its results.

1.3 Network Connection

The QABC Pro may be used as a standalone device that does not require a browser or operating system for daily use once baselines have been established. To create Baselines, take measurements in Real-Time or Physics Mode, and transfer data, the QA BeamChecker Pro device needs to be connected to a network computer accessing the application software through the web page interface via Ethernet or Wi-Fi access point.



Network and connection characteristics:

- Supported connections are DHCP and Static (used for ethernet cable connection only).
- Ethernet cable must be 100 meters or less in length with standard RJ45 connectors on both ends.
- The QABC Pro supports 10/100 Mbit connections. 1000 Mbit (1Gbit) is not supported.
- Minimum of Category 5 Ethernet cable is required to support 100 Mbit connection.
- Uses the IEEE 802.11 b/g/n standards in 2.4 GHz band
- Supported closed Wireless LANs only using the "Wi-Fi Protected Access 2 – Pre-shared Key (WPA2-PSK)"

Technical specifications of the network connection:

- Connection protocol: TCP/IP
- Connection type: HTTP default uses port 80. The port can be changed after installation using the QABC Pro Admin Utility (see Section 4.2 QA BeamChecker Pro Admin Utility – Set Ports for details).
- Connection type: HTTPS default uses port 443. The port can be changed after installation using the QABC Pro Admin Utility. (see Section 4.2 QA BeamChecker Pro Admin Utility – Set Ports for details).

Information from the QABC Pro device will flow over TCP/IP network using IPv4 Port 30319. The QABC Pro product is intended for internal networks only and for use with a single web browser session. Other users may access the web client interface to view Analysis and Setting pages while the device is in use. The use of multiple QABC Pro devices on different linac and device configurations is allowed.

Please note that high latency networks will impact the performance of the web browser session.

Connection to an IT network or other equipment could result in previously unidentified risks to patients, operators, or third parties. Users should identify, analyze, evaluate, and control these risks.

Changes, updates, or other alterations in the network connection could introduce new risks that require additional analysis.

1.4 Default Self-Signed Certificate

This product ships with a **default self-signed certificate** to allow HTTPS to function immediately after installation.

Purpose:

- Enable encrypted communication out of the box
- Avoid requiring certificate setup during initial installation

Expected behavior:

- HTTPS is enabled by default
- Browsers will display trust warnings unless the certificate is replaced or explicitly trusted

The included certificate is intended for evaluation, development, and internal use.

To learn more about certificates and replacing the certificate, please contact Customer Care at support@standardimaging.com for assistance.

1.5 Unboxing

A QABC Pro package includes the following items:

Physical Hardware

- (1) QA BeamChecker Pro Device
- (1) Power/Data Cradle
- (1) Universal Input Power Supply, 9 Volt DC

- (1) 100 ft. Ethernet Cable
- Optional accessories purchased

The shipping box will be marked for which way is up. Place the box on a solid, flat surface and cut the tape to open the box. Do not use a knife to cut the tape. Unpack the shipping box and identify the parts.

1.6 Abbreviations

Abbreviations	
QA BeamChecker Pro	QABC Pro
Quality Assurance	QA
Power on Self-Test	POST
Resistance Temperature Detector	RTD
Real Time Clock	RTC
QABC Pro Application Server	QABCP-AS
Ferroelectric Random Access Memory	FRAM

2 Quick Reference Guide

This section will give a basic overview for setting up and using the QA BeamChecker Pro (QABC Pro). The following are simplified, generalized instructions for taking measurements with the QA BeamChecker pro. For a more detailed look at the at the various functionality of the QABC Pro, see Sections 5 through 9. (refer to the Table of Contents).

- Hardware Description
- Database and Software Installation and Setup
- Settings
- Baseline Acquisition
- Performing Routine Measurements
- Data Analysis and Report
- Physics Mode Operation

2.1 Software Installation

Pre-configuration Installation Requirements

- SQL Server Express 2022 (minimum)
- SQL Server Management Studio
- Google Chrome Browser
- Windows credentials to exercise administrative rights for SQL Server, SQL Server Management Studio installation
- Windows credentials to exercise administrative rights for software and database installation.

Before setting up the software, it is recommended to close all other active programs. Software installation is a two-part process where the QA BeamChecker Database Installer is used first, followed by the QA BeamChecker Application Installer.

Database and Software Application Installation

1. Log-in to your SI Customer Portal account on the Standard Imaging website.
2. In the software license tab, find the software you wish to download and select 'Download'. An email with the installer links will be sent to the email account you have assigned to your Customer Portal account.

NOTE: Take note of the License Key as you will need this information as part of the installation process.

3. Open the email and download the both the Database and Application Installers to a location of your choice.
4. Go to the selected download location to confirm that both the installers are present.
5. Double click on QA BeamChecker Pro Database Installer to start the installation and follow the installation wizard. A SQL login username (not 'sa') and password are required.

NOTE: the user name and password are required in Step 17 below.

6. When the database installation has completed, Click 'OK' to close the popup, then 'Close' to close the installer.
7. Double click on QA BeamChecker Pro Application Installer to run it as an administrator and follow the installation wizard. Note that if .NET prerequisites are missing, they will be installed as part of this installation process and a reboot will be required before proceeding to the rest of the installation.
8. Read and click I Agree on the license agreement.
9. The application URL is how clients will access the application server via a Chrome web browser. The default is the Windows machine name and network domain, accessed via HTTPS. For example: <https://qabcym.topclinic.com> where "qabcvm" is the machine name and "topclinic.com" is the domain. Click "Install"..
10. When installation is completed, click 'Close'.
11. A desktop icon for the QABC Pro Admin Utility is automatically created.
12. Open the QABC Pro Admin Utility to activate your license key, preferably using the Internet Activation. If Manual Activation is required, please contact Customer Care at support@standardimaging.com for assistance.
13. Click OK when the Success Activation message appears.
14. Still within the QA BC Pro Admin Utility, navigate to the "Database" menu and select "Find Server/Set SQL User".
15. Click OK on the Server Restart Required popup message.
16. Select your QA BC Pro SQL database instance from the available list. If it is not present, click the Manual checkbox and enter it in the "Selected Server input field".
17. Enter the SQL Authentication Information created in Step 5 above.
18. Then select "Test Connection"
19. When the Test Connection Success popup appears, click OK, then click on the "Select" button.
20. The QABC Pro Admin Utility now displays the Server Run State as "Running". Once the Current DB Server, SQL User and SQL Password is Set fields are populated, the Admin Utility can be closed.

2.2 General Operation

It is recommended to charge the device using the provided power supply and cord at least 8 hours before first use. Once charged, the QA BeamChecker Pro runs on battery power for up

to 8 hours. Power can be connected to the device directly or to the Power/Data Cradle with the device placed on it, using the supplied power supply and cord.

Hardware Set-up

1. Set the device on the treatment couch at 100 SSD and align to either the 10 x 10 cm field or the 20 x 20 cm field.
2. Power on the device and when the home page is displayed, access the network setup menu and other information about the device via the gear icon at top left of the touchscreen display. Use the up and down arrows to navigate through the setup menu.
3. Enter the software application IP address (appserver IP).
4. The default device IP configuration is DHCP, but it can be set to static if preferred.
5. If taking measurements in Standalone Mode (no connection to software for instant pass/fail results with complete results stored on the device until downloaded), use the ">" to select the user performing QA and then the linear accelerator to be tested. Skip Step 4.
6. If the device is to be used to create baselines or take measurements in Real-Time or Physics Mode, establish connectivity between the device and software either using the provided ethernet cable, or via Wi-Fi (if an access point is available in the treatment room). Then set the device to the Home page using the home icon on the touch screen which readies the device for beam delivery.
7. Exit the vault.

Software Application Set-up

1. Go to the Chrome browser and enter the URL for the current Beam Checker Pro database server web page.
2. Use the gear icon at the top left of the application home page to access Settings to set up the Organization, Machines, Users. And Devices
NOTE: All but the Devices can be configured before setting up the hardware and establishing communication with the device.
3. First time use, in Settings > Devices, click on the "Search for New Devices" button. Once found, the device Type and Serial # will be displayed. Use the input fields to add a device Name and device Description. Use the gear icon to enter Wi-Fi access point(s) and password(s). Then perform a Synchronization which communicates the machine and user information created in the software settings to the device.

Establish Baselines

The device must be connected to the software application via ethernet or Wi-Fi to create baselines. If sufficiently charged, no connection to a power supply is required for creating baselines. After baseline creation, the device is most commonly used in Standalone mode to efficiently complete morning daily machine QA without software connection, cables, or using a rigid beam delivery routine.

1. Establish device-to-software connection via ethernet cable or using a Wi-Fi access point.
2. Enter the software application URL in the Chrome browser.
3. 'Select a Clinic' from the dropdown menu on the menu bar.
4. Go to the Baseline tab.

5. Enter a name for the baseline which will be referenced for all measurements relative to it. This name is not editable, so ensure to use standard clinical naming conventions.
6. Select 'Add' to enter new baseline parameters, all parameters must be filled in.
7. Click the Start button and when "waiting for beam" is displayed, deliver the beam as stated in the baseline parameters.
8. Accept the baseline if the results displayed are satisfactory and repeat steps 1-6 until all baselines are acquired and saved.
9. If the baseline acquired is unacceptable, click "Discard baseline" > click Start > deliver beam when ready. Repeat until an acceptable baseline is achieved, then repeat steps 1-6 until all baselines are acquired and saved.

Perform Daily QA in Standalone Mode

1. Follow the Hardware Setup steps listed above excluding Step 4.
2. On the device, use the '>' icon to select the current user and linear accelerator from the lists.
3. Return the Home screen on the device and exit the vault.
4. Deliver each energy in any order and the device will automatically match results to its baseline and display PASS or FAIL.
If the delivered beam is within tolerance limits, the device will reset to READY indicating that it is set to receive the next beam delivery.
If the results fail, the device display will switch to a white background and display which metric(s) are out of tolerance for 15 seconds before resetting itself to the READY state again.
5. Repeat steps 1-4 until all energies and field sizes have been tested for the day.
6. Return the device to the Power/Data Cradle for data download via ethernet and charging. Or, if using a Wi-Fi connection, the data will automatically transfer to the database.
7. Power off the device once data transfer is finished.

Perform Daily QA in Real-Time Mode

1. Follow the Hardware Setup steps listed above, skipping Step 3.
2. Verify that the device display is set to the Home page and exit the vault.
3. Enter the software application URL in the Chrome browser.
4. 'Select a Clinic' from the dropdown menu on the menu bar.
5. Go to the Real-Time Tab
6. Select the linac from the Select Linac dropdown menu, then select the QA BeamChecker that has been set up for testing from the Device dropdown menu. Only devices "online" will be available for selection in the dropdown menu.
7. Once the Start button becomes active, signaling that the device is online and ready to take a measurement, click Start, and when the Ready for Beam message appears, turn on the beam.
8. Deliver each energy, in any order, using the same parameters as for its established baseline and the device will automatically match results to its baseline and display the results and associated baseline information. The display includes the metrics table of measured results for Dose (cGy), Constancy, Flatness, Axial and Transverse Symmetry (% difference to baseline) and Chamber Profile graphs.
9. If the results are acceptable, click Save, if not, select discard and repeat the test by clicking Start and turning on the beam when the device is ready.

10. Repeat steps 6-9 until all energies and field sizes have been tested for the day. All saved measurements will automatically be added to the database and trended in Analysis.
11. Return the device to the Power/Data Cradle to recharge.
12. Turn off the device.

Review Data in Analysis and Print Reports

1. Select which Clinic's data that is to be reviewed in the menu bar.
2. Select the Analysis Tab choose the linac and device from the dropdown menus.
3. All baselines created for the selected linac using the chosen device will be displayed. Click on a baseline name to view its relative measurement results over time. The past 30 days test results will be displayed in both tabular and graphical formats. Use the dropdown menu to select a different date range.
4. Click on a result in the Daily Measurements summary table to display Chamber Information in either inplane pC/crossplane pC or inplane/crossplane cGy.
5. To "hide" a datapoint from the graphical display, click on the open eye icon in the Daily Measurements table. The icon will change and the datapoint removed from the graph. Hidden datapoints will be marked as such on a .csv export file.
6. PDF reports and CSV files are generated via the Generate Report button. The CSV selection will automatically generate a file for the date range selected. Save said file to a location of choice. The PDF selection will provide an opportunity to enter a Report Comment before generating the report. Save the PDF report to a location of choice.

Physics Mode

Physics Mode is used to take individual measurements with the device that may be used for troubleshooting or research purposes. Each measurement can be exported as a .csv file only. Once results are displayed, they can be exported as a .csv file only. The measurement is cleared by clicking on the Start button or navigating away from this page. Physics Mode data is not compared to a baseline nor is it stored in the database.

1. 'Select a Clinic' from the dropdown menu on the menu bar.
2. Select the linac from the Select Linac dropdown menu, then select the QA BeamChecker that has been set up for testing from the Device dropdown menu.
3. Complete all input fields displayed at left.
4. Enter any notes about the measurement for inclusion in the .csv file that may be desired.
5. Select Start button when ready to turn on the beam as the time elapsed timer starts immediately.
6. Select stop when beam is delivery is complete.
7. Click the Export to CSV button if a record of the measurement is desired.
8. Repeat steps 1-7 until all measurements are taken.
9. Shut off device and return it to the Power/Data Cradle for recharge and storage.

3 Hardware Description

The QA BeamChecker Pro hardware is a 2D array of 29 air vented ionization chambers to use as a daily check of linear accelerator machine performance including beam flatness, beam symmetry, beam constancy and dose output. There are four energy detection chambers with integrated buildup which power SI's unique automatic energy detection capability. The array and associated electronics are housed in Blue Water™ (Blue Water is manufactured by

Standard Imaging (visit www.standardimaging.com/phantoms/blue-water to learn more.) One diode is located within the electronics housing to monitor dose to the electronics.

The device internal memory can store a maximum 650 measurements which allows users to operate the device as an internally comparative measurement tool that indicates to the user via visual and audible displays if a given external radiotherapy beam has deviated from its established baseline parameters (Standalone Mode).

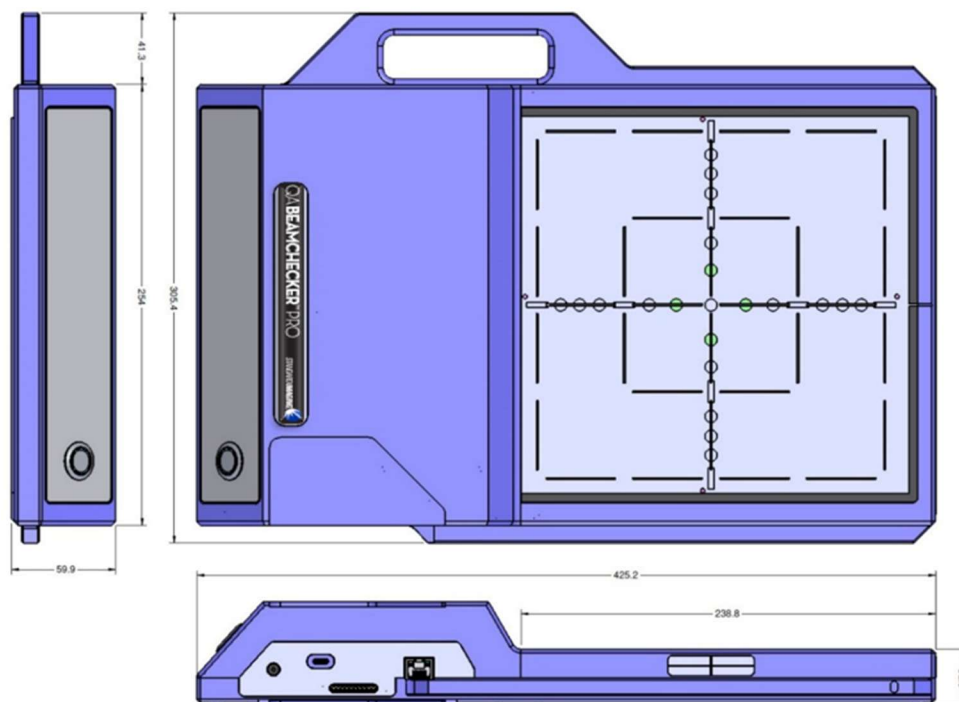
Note that the maximum number of measurements that can be stored in the device's internal memory will vary depending on the number of clinics, linear accelerators, and baselines created in the software application Settings and thus transferred to the device memory.

The device includes a long-lasting, rechargeable LiFePO₄, Lithium Iron Phosphate, battery that provides approximately eight (8) hours of continuous use before requiring a recharge. The battery is recharged by placing the device on the supplied Data/Power Cradle connected to the provided power supply or with the power supply plugged directly into the device. It is recommended to store the QABC Pro on the Data/Power Cradle when not in use.

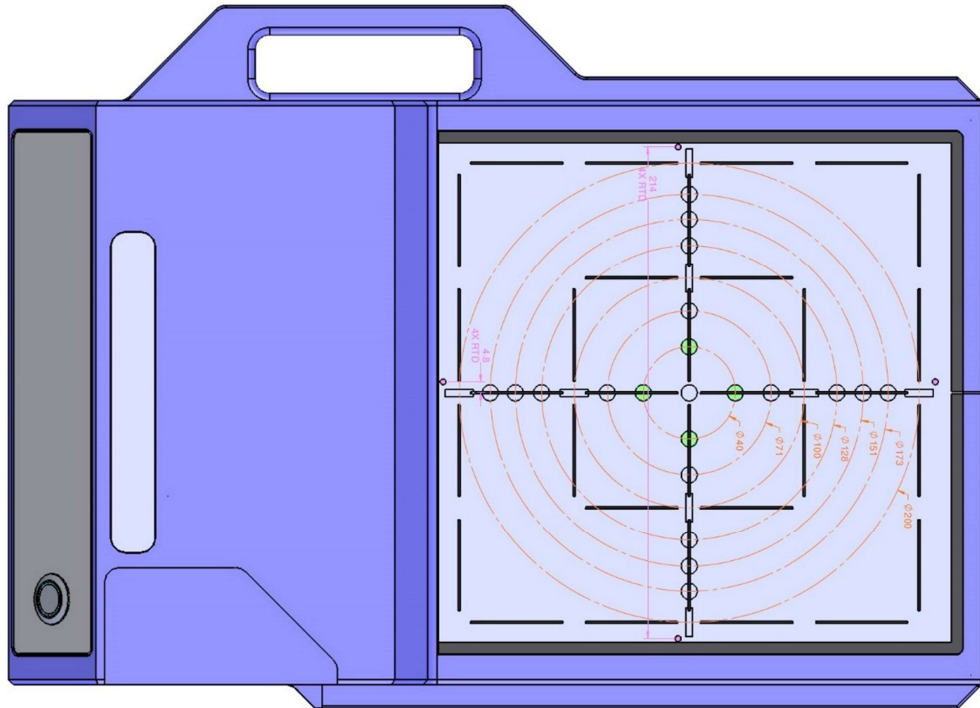
For ethernet communication, the QABC Pro communicates via standard ethernet network interface and comes equipped with an RJ45 interface port. It is recommended that this interface be used in a direct (point-to-point) connection to the host computer for optimal performance. The CAT5e/CAT6 cable that is included with the QABC Pro should be used.

Wi-Fi communication functionality is also built into the device which permits wireless communication to software application features such as baseline creation, Real-Time Mode, and Physics Mode operations. Wi-Fi communications may also be used to transfer data from the device's internal memory to the database.

3.1 Device Overview



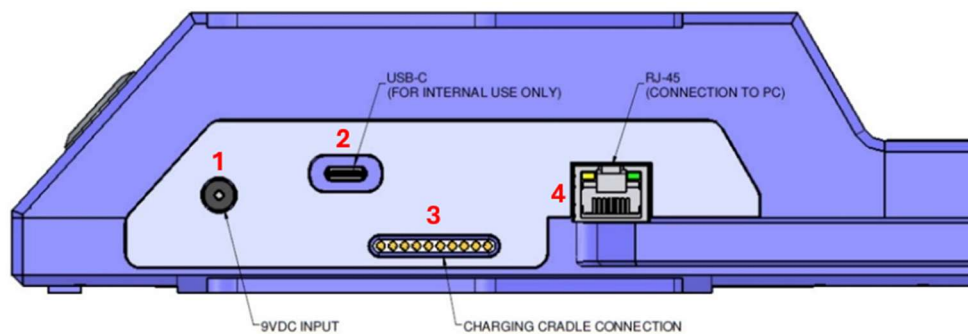
Dimensional information for the QABC Pro



Detector Placement

GREEN = Energy Detection Chambers (4 total), PINK = RTDs (4 total)

3.2 Connections and Indicators

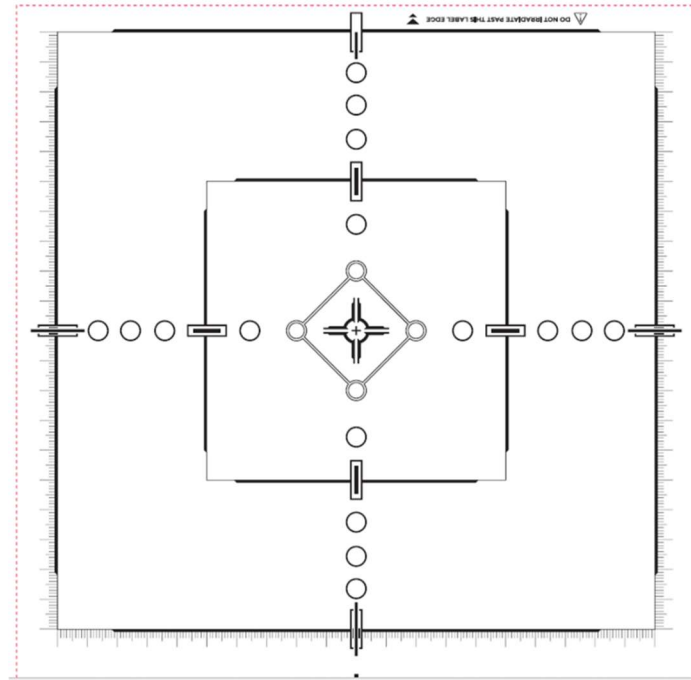


1. **Power Adapter Input:** 9 VDC, use only with the provided power supply.
2. **USB-C Port:** (for internal use only)
3. **Power/Data Cradle Connection:** Used when the QABC Pro device is placed on the Power/Data Cradle to charge the device battery.
4. **Ethernet Port:** RJ-45, this port enables an ethernet cable to be connected for external control of the device in lieu of using Wi-Fi (ethernet connection to computer)

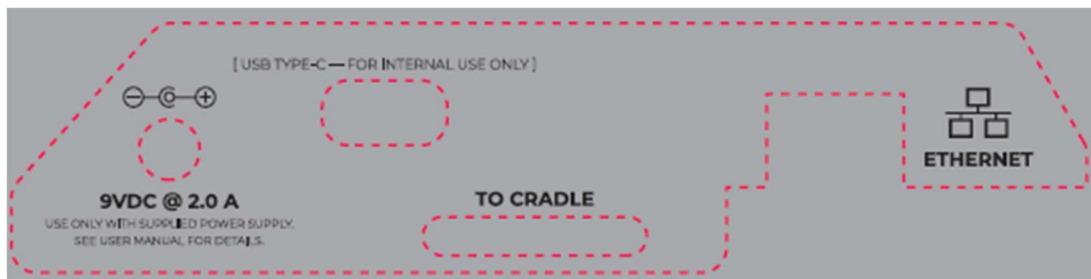
3.3 Device Labels



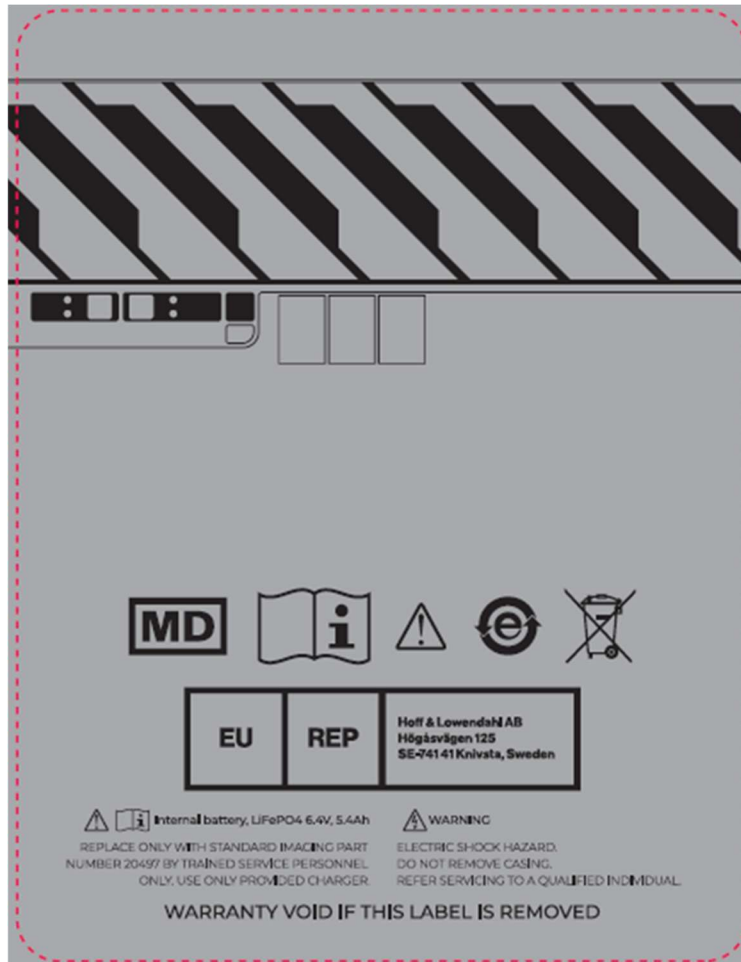
Device Brand Name Label located front top of device



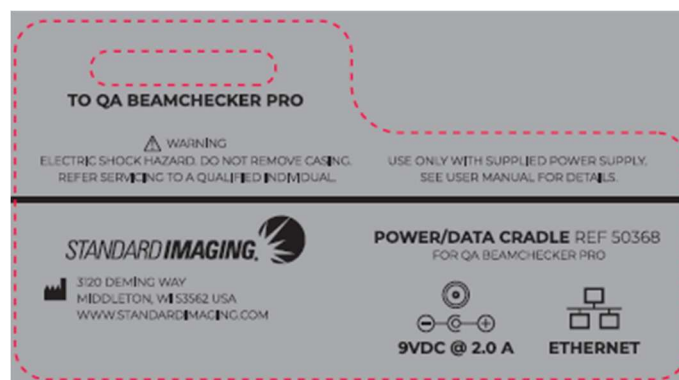
Top Label over Ionization Chamber Array



Connection Label located on side of device



Bottom Label



Power/Data Cradle Label

3.4 Touchscreen Display Settings and Controls

The QA BeamChecker Pro is equipped with a large 5.5-inch OLED touchscreen display which features a user-friendly interface for quick and efficient setup, access to device details and diagnostics, and the convenient display of measurement activities, alerts or failures.

Home Screen

When the device is turned on, it will run through a Power On Self-Test (POST). Once completed the Homepage is displayed which provides two action buttons together with several indicators.



Homepage Display

1. Gear button provides access to setup configuration settings and view diagnostic information about the device.
2. '➤' Standalone Mode Setup button for user and machine selection
3. Connection type indicator: ethernet (pictured), Wi-Fi or none
4. Firmware (FW) Version installed on the device
5. Battery Level – if the battery level falls below 15%, the display will change to 'LOW BATTERY' at which point the user has 3 minutes to connect the device to the provided power supply to continue using it. If not connected and the battery level falls below 10%, the device will automatically shut down. It is therefore recommended to connect the device to the power supply or recharge the device on the Power/Data Cradle when the battery level is <30%.

NOTE: The device must be returned to the Homepage by touching the home icon on the display in order to ready the device for the following functions: establishing baselines, using Real-Time Mode, or using Physics Mode.

Settings

Hardware settings can be accessed by touching the gear icon on the home screen. The following items are included in the device Settings:

- IP Address: IP address of the device. Will auto-populate if the network type is dynamic, will need to be entered manually if the network type is static
- Port Number: Default setting is 30319
- Net Mask: Default setting is 255.255.000.000
- Gateway Address: Default setting is dependent on local network
- Network Type: Select either Static or dynamic (DHCP)
- AppServer IP Address: to be entered, based on QABC Pro AppServer installation location
- AppServer Port Number: 80 or 443
- MAC Address: shows either the ethernet or Wi-Fi address of the device on hospital network
- Volume: Adjust the device indicator volume

Each of these items should be reviewed before using the device for the first time. If using a dynamic DHCP network type, the IP Address and the AppServer IP Address should be verified before starting daily QA to ensure they have not changed.

When done with the device Settings, touch the Home icon to return the device to the Homepage.

Diagnostics

Within the Settings menu, select “Diagnostics” on the touchscreen to view the following diagnostic information about the device:

- Lifetime Charge (Center) – displays the accumulated lifetime charge to the center chamber.
- Lifetime Chare (Monitor) – displays the accumulated lifetime charge of the diode monitor placed within the electronics housing.
- RTC – displays the time and date measured by the real time clock within the device.
- Chamber Rates (pA) – displays the rate in pA for each chamber. Individual chambers can be zeroed here.
- Serial Number – displays the device serial number.
- Battery – displays the main battery diagnostics as well as charging state.
- Temperature/Pressure – displays the temperature of the PCB and absolute pressure (uncorrected for sea level).
- Bias – displays the applied bias.
- RTD – displays the temperature read at each of the four RTDs, top, bottom, left, and right.
- ESP-AT Version – displays the AT and SDK versions of the Wi-Fi component installed in the device.

When done using the device diagnostics menu, touch the Home icon to return the device to the Homepage.

Standalone Mode Setup

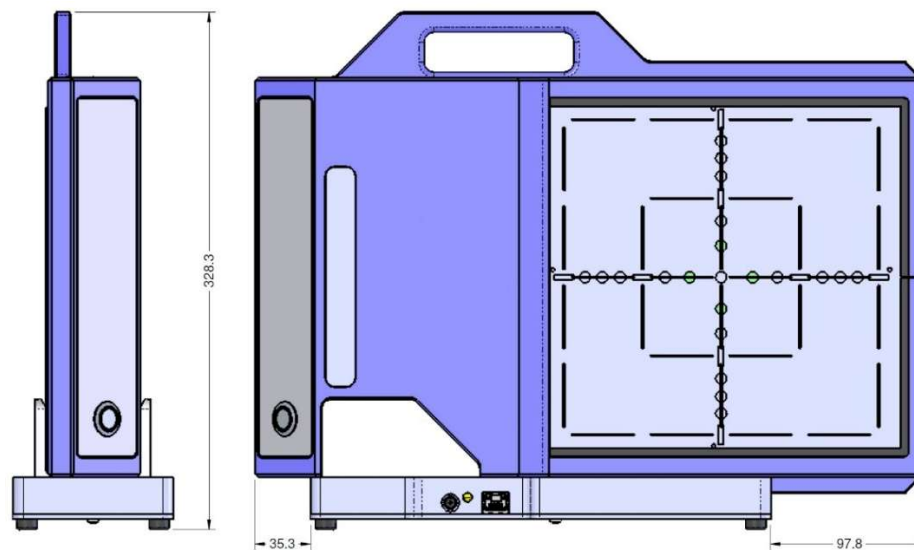
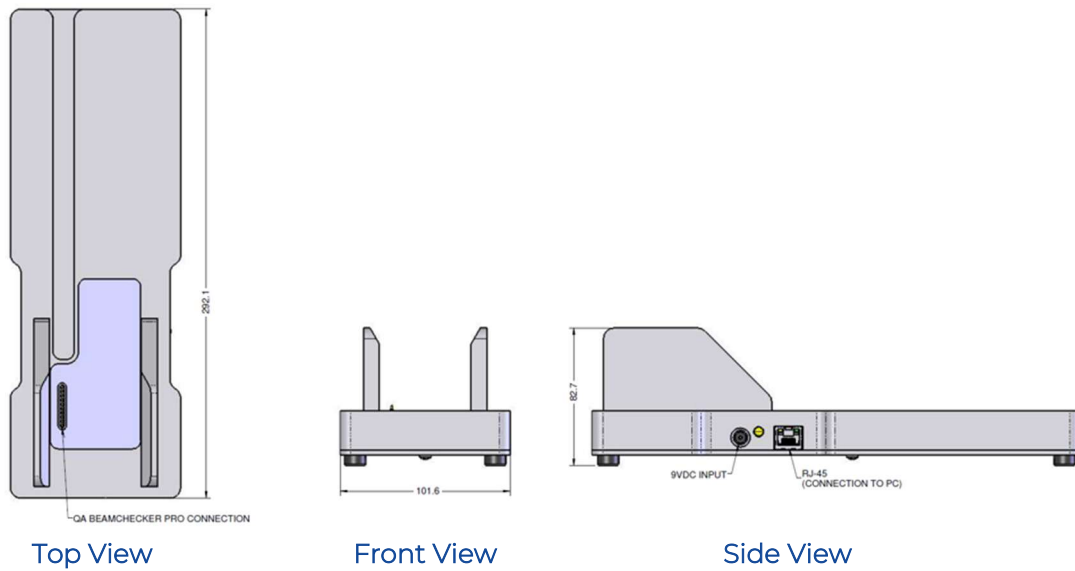
The User and Machine information, created in the web application Settings menu, is automatically uploaded to the internal memory of the device when either Wi-Fi or ethernet communication is active, making them available for selection for Standalone mode operation.

On the device touchscreen homepage, tap on the “>” to prepare the device for Standalone operation.

Scroll up or down to the find the current user’s name and tap to select it. Then tap on the machine name being tested from the list available. Once the machine selection is made, an automatic zero of the unit is done to ready the device for measurement.

When the READY state is displayed, the user can exit the vault and proceed with measurements (see Chapter 6 – Routine Measurements below for further detailed instructions).

3.5 Power/Data Cradle



QA BeamChecker Pro Device on Cradle

4 QA BeamChecker Pro Installation Procedures

The QABC Pro software is designed to run under Microsoft Windows® operating systems using a SQL Server Express, or better, database. As a locally hosted web application, the use of Google Chrome browser is required.

Pre-configuration Installation Requirements

- SQL Server Express 2022 (minimum)
 - With TCP/IP enabled
 - With SQL and Windows authentication enabled
- SQL Server Management Studio

- Google Chrome Browser
- Windows credentials to exercise administrative rights for SQL Server and SQL Server Management Studio installation
- Windows credentials to exercise administrative rights for software and database installation.
- Confirmation from the IT Department that http Port 80 and https Port 443 are **unblocked** and **available** (not reserved by a different software application). If blocked, have IT provide port numbers that are unblocked and unreserved for QA BeamChecker Pro communications.

Please contact Standard Imaging Customer Care at support@standardimaging.com to schedule time to review the pre-configuration tasks and install the QABC Pro software.

The QABC Pro installation/deployment is designed to be located in the Data Center or equivalent, accessible to end users via an HTTPS connection from the Google Chrome browser. The installation includes a self-signed certificate so the user will need to provide their own trusted certificate if desired. For more information about certificates and replacing the certificate, please contact Customer Care at support@standardimaging.com.

Before setting up the software, it is recommended to close all other active programs. Software installation is a two-part process where the QA BeamChecker Pro Database Installer is used first, followed by the QA BeamChecker Pro Application Installer.

4.1 Database and Software Application Installation

The QABC Pro software is installed using two installers, the QA BeamChecker Pro Database installer and the QA BeamChecker Pro Application Installer. It is recommended to close all other active programs before starting the installation process.

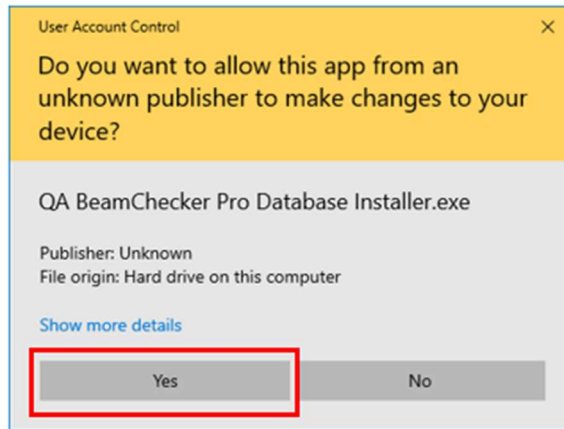
Step 1 – Download Software Installers

1. Visit www.standardimaging.com/support/customer-portal-access to request access to the customer portal. Paper or emailed copies are available within 7 days from Customer Care at 1-800-261-4446 or support@standardimaging.com.
2. Once you have an account, go to: www.standardimaging.com
3. From the main menu, select Customer Care Portal and log in.
4. In the software license tab, find the software you wish to download and select Download. Take note of the License Key, you will need this information at the start of the application set up process.
5. A message will appear requesting that you check the email account you have assigned to your Customer Portal account.
6. Go to your email account, find, and open the email from Standard Imaging.
7. Select the link provided in the body of the email and download both the Database and Application Installers to a location of your choice.
8. Go to the download location you selected in the step above and confirm both the Database Installer and Application Installer are present.

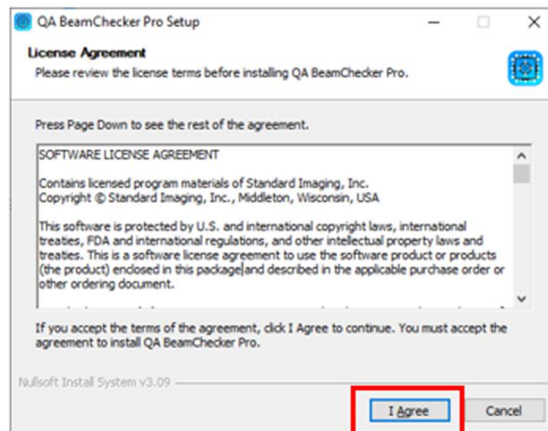
Step 2 – QA BeamChecker Pro Database Installation

Windows credentials to exercise administrative rights are required for database installation.

1. Double click on the "QA BeamChecker Pro Database Installer" to start the installation.
2. As noted above, the application will request elevated access rights to make changes. Click "Yes" to the User Account Control dialog message.



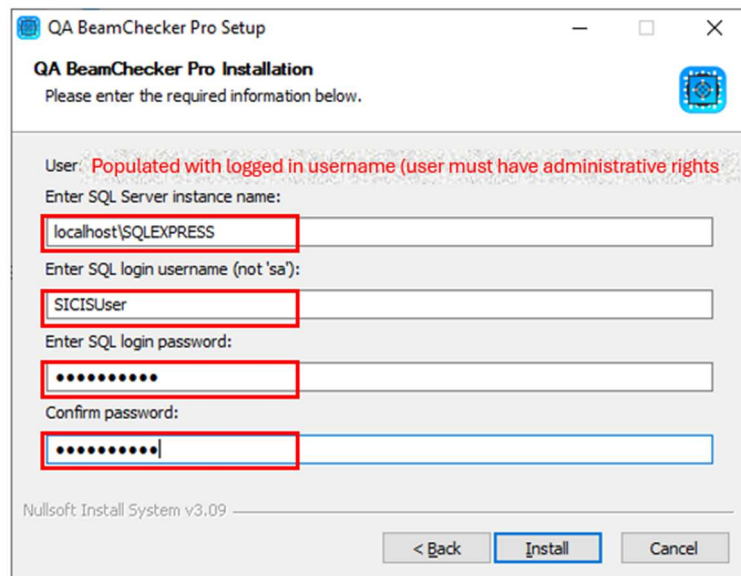
3. The QA BeamChecker Pro application installer will begin by displaying the license agreement. Read it and click "I Agree".



4. Enter the database information.
The SQL Instance name is the location of your SQL database server.
The logged on user must have administrator privileges.
The username can be any name other than "sa" that does not exist in the database.
The password must:
 - Be at least 8 characters long
 - Contain at least one uppercase character
 - Contain at least one lowercase character
 - Contain at least one numeric character

- Contain at least one special character from this set: !@#\$%^&*()_+={}[]:;<>
- Not contain ', \, or spaces

Once all information is entered, click “Install”.



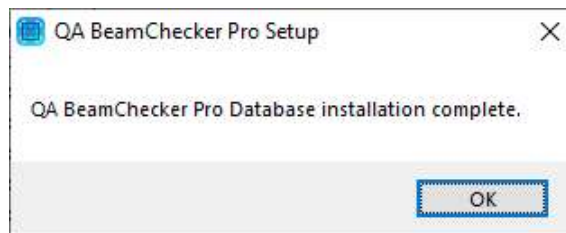
The screenshot shows the 'QA BeamChecker Pro Setup' window. The title bar says 'QA BeamChecker Pro Setup'. The main heading is 'QA BeamChecker Pro Installation'. Below it, it says 'Please enter the required information below.' There are five input fields, each with a red rectangular highlight around it:

- 'User': Populated with 'logged in username (user must have administrative rights)'
- 'Enter SQL Server instance name:': localhost\SQLEXPRESS
- 'Enter SQL login username (not 'sa')': SICISUser
- 'Enter SQL login password:': A series of dots representing a password.
- 'Confirm password:': A series of dots representing a password.

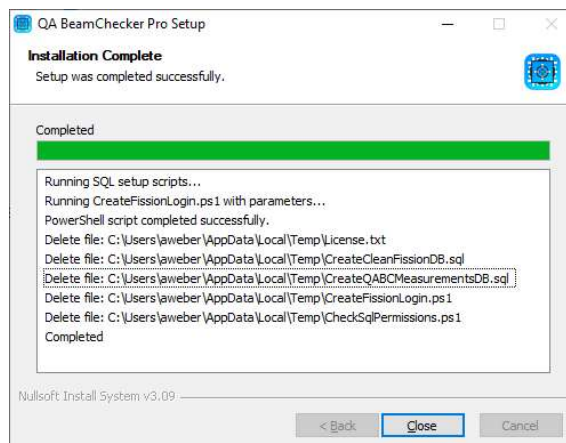
 At the bottom, there are three buttons: '< Back', 'Install' (highlighted with a blue border), and 'Cancel'. The footer text is 'Nullsoft Install System v3.09'.

Note that the SQL login username and SQL login password may be needed in the future should a database update be necessary.

5. When the QABC Pro database installation is completed. Click “OK”.



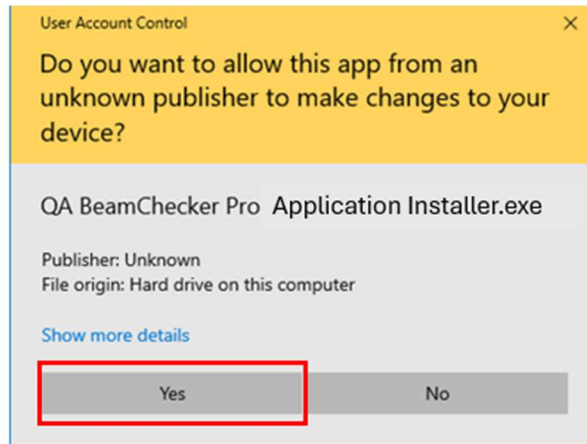
6. Click “Close” to finish the QABC Pro database installation.



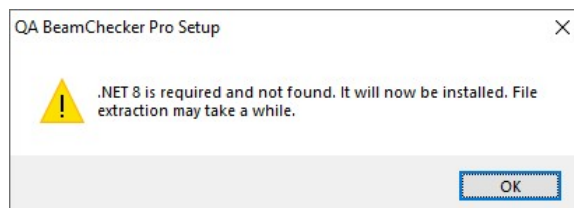
Step 3 – QA BeamChecker Pro Application Installation

Windows credentials to exercise administrative rights are required for software application installation.

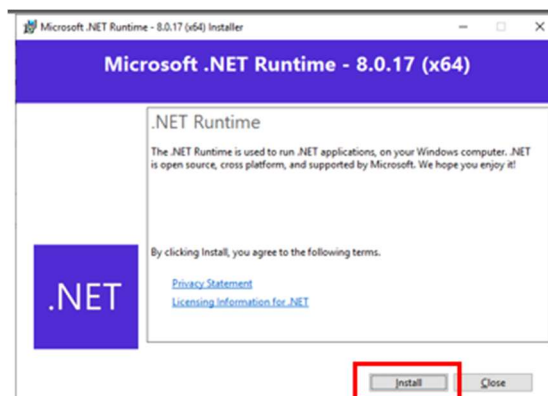
1. Double click on the “QA BeamChecker Pro Application Installer” to start the installation.
2. The application will request elevated access rights. Click “Yes” to the User Account Control dialog message.



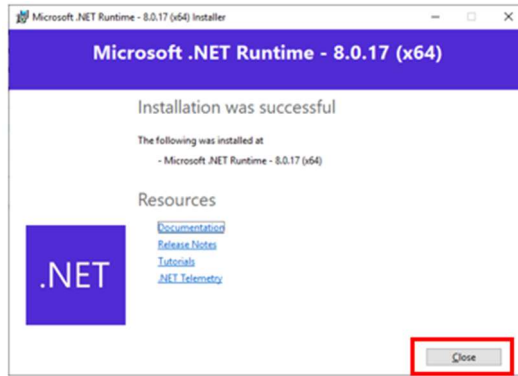
3. If your system is missing .NET prerequisites, they will be installed before QABC Pro installation begins. Click “OK” to begin installing the .NET prerequisites.



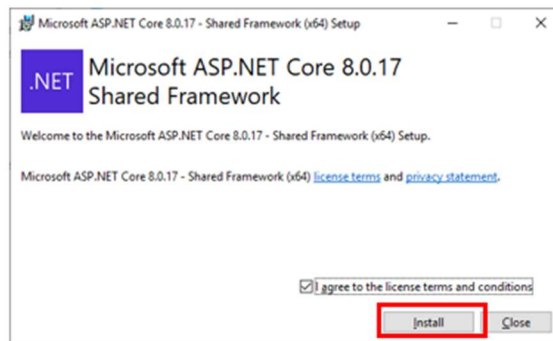
4. If the .NET runtime 8.0 is missing, it will be installed. Click “Install” to begin installing .NET 8.0.



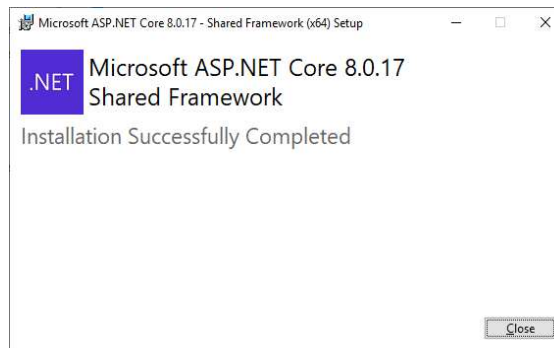
5. Once the .NET 8.0 installation is complete, click “Close”.



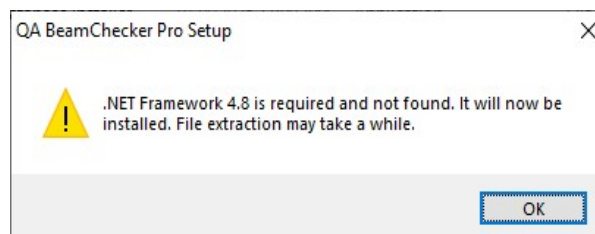
6. If Asp.NET Core 8.0 is missing, it will be installed. Check the license terms agreement checkbox, then click “Install” to begin installing Asp.NET Core 8.0.

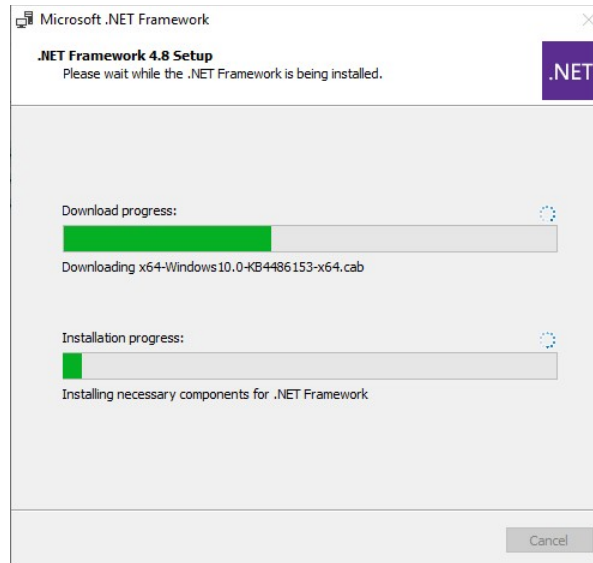


7. Once the Asp.NET Core 8.0 installation is complete, click “Close”.

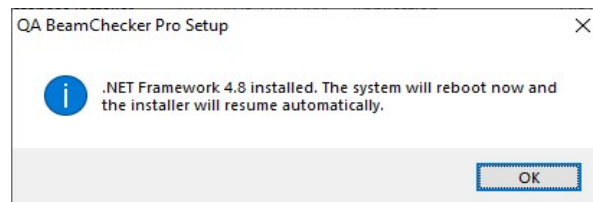


8. If the .NET Framework 4.8 is not installed on the Windows Server 2019. It will be downloaded and installed automatically. Click “OK” when prompted. It will close upon completion.

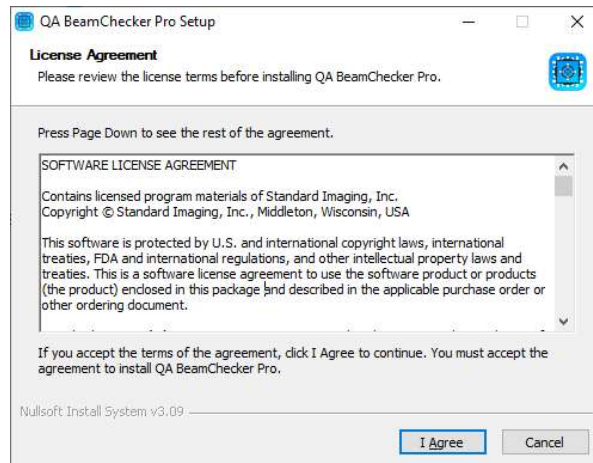




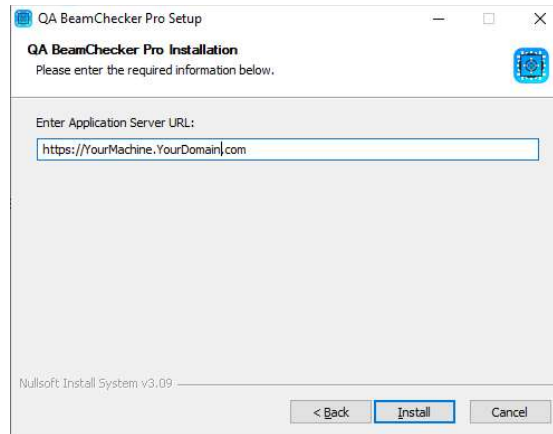
9. Reboot the system when the .NET Framework 4.8 setup has completed. Installation will automatically continue when the machine reboots and you log back in.



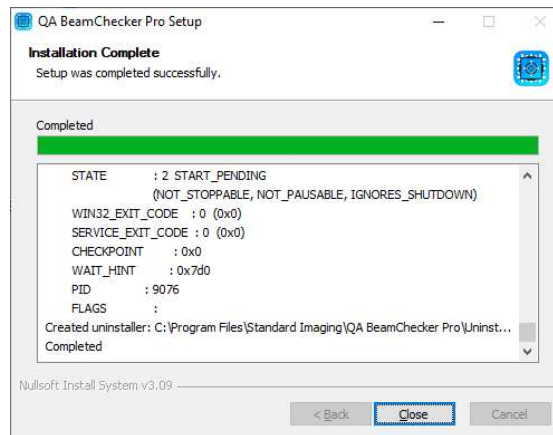
10. After prerequisites are installed, the QA BeamChecker Pro application installer will begin by displaying the license agreement. Read it and click "I Agree".



11. The application URL is how clients will access the application server via a Chrome web browser. The default is the Windows machine name and network domain, accessed via HTTPS. For example: <https://qabcym.topclinic.com> where "qabcvm" is the machine name and "topclinic.com" is the domain. Click "Install".



12. Once installation finishes, click “Close” to finish QA BeamChecker Pro application installation.



13. Upon installation completion, the QABC Pro Admin Utility will be added to the desktop.



4.2 QA BeamChecker Pro Admin Utility

The QABC Pro Admin Utility is used to perform select tasks, starting with license activation and connecting to the database. It is accessed via the desktop icon. Double click on the desktop icon to open the Admin Utility.

License Activation

There are two options to register and activate the license provided in the SI Customer Portal. The Internet activation is described below.

- Internet activation: This is the preferred method of license activation if an internet connection is available. The application will register the license key, provided in the SI

Customer Portal, via the internet. Enter the license key, contact and address information. When finished, select Activate. This will activate the license and allow the program to be used.

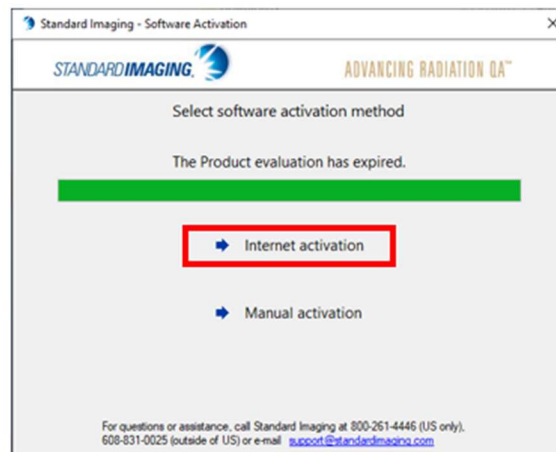
- Manual activation: Manual activation is used when an internet connection is not available. An Unlock Code is needed to complete a manual activation. The code is obtained by weblink, phone or email as noted in the Manual Activation dialog box. Once received, enter the unlock code in the field provided and select Activate. This will activate the license and allow the program to be used.

1. On the desktop, double click the QABC Pro Admin Utility icon.



Note: if the QABC Pro Admin utility does not start as expected, it may be because the license process has been flagged by the operation system as a threat. If that happens, go to the “Whitelisting License Process” below.

2. The first time you run the QABC Pro Admin utility you will get the license popup first. Select “Internet activation”.



3. Enter your user and license information required fields, then click “Activate”.

Standard Imaging - Software Activation

STANDARDIMAGING. ADVANCING RADIATION QA™

Internet Activation

License Key: * Required

Contact

First name: Last name:

Email: Position:

Facility: Phone:

Fax:

Address

Line 1: Line 2:

City: State/Prov/Reg:

Postal Code: Country:

< Back Cancel **Activate**

- Once your product is successfully activated, click “OK”.

Success Activation

i Your product has been successfully Activated

OK

Establish the Database Connection

- Select the “Database” menu item, then select “Find Server/Set SQL User” menu item.

QABC Administration

File **Database** Service Help

Find Server/Set SQL User

Service User Reset

Current Sql Password Is Set: False

Server Run State: Running

Licensable Product: QA BeamChecker

License Status: License Activated

License Key: 385941820590194505

Authorized Linac Count: 10

Active Linac Count:

License Activation Date: 9/17/2025

License Expire Date: Never

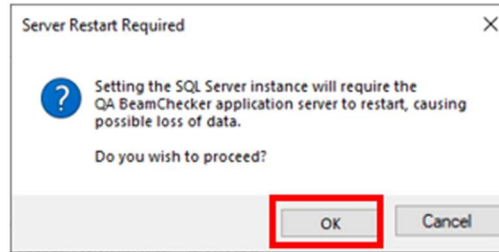
License Remaining: Infinite

Maintenance Start Date: 9/4/2025

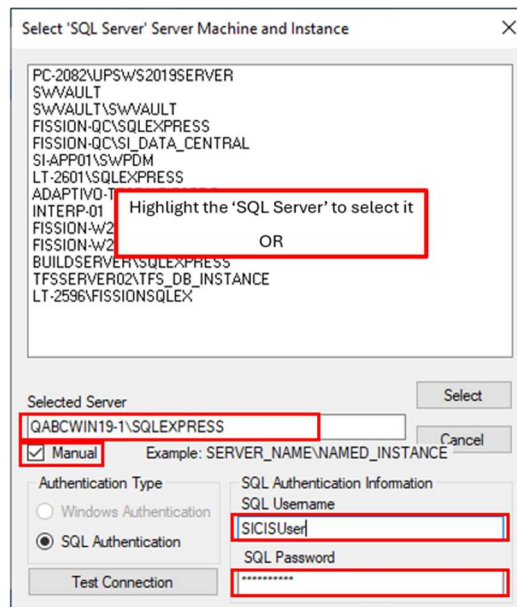
Maintenance End Date: 9/20/2035

Maintenance Remaining: 3648 Days

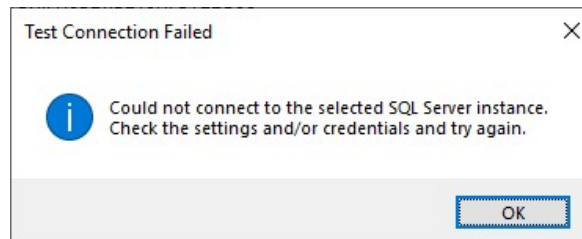
- Click “OK” to the warning message box.



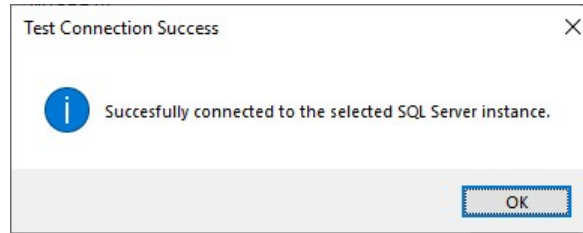
3. If the SQL server instance is listed, click on the name to select it.
 If the SQL service instance is not in the list, tick the "Manual" checkbox and enter the SQL server name created in Step 3 – QA BeamChecker Pro Application Installation above.
 Once the instance is either selected from list or manually enter, fill in the SQL Username and password fields and click "Test Connection".



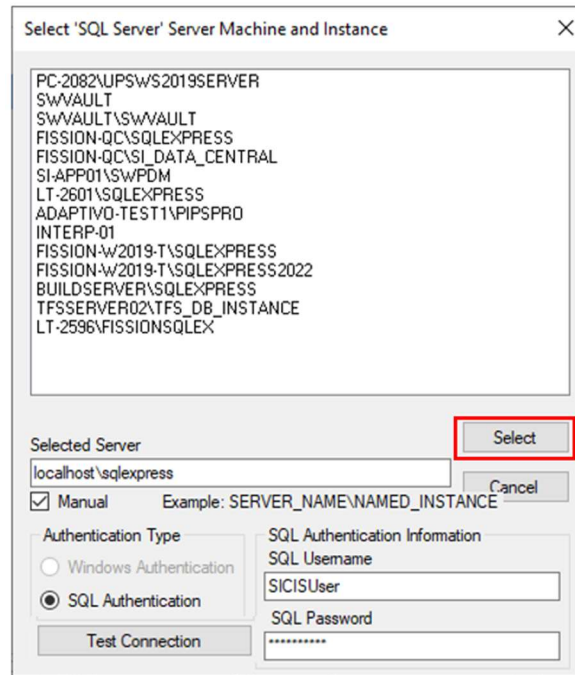
4. Should the Test Connection fail, click "OK" to the message box and review and correct the information entered as needed. Then select "Test Connection" again.



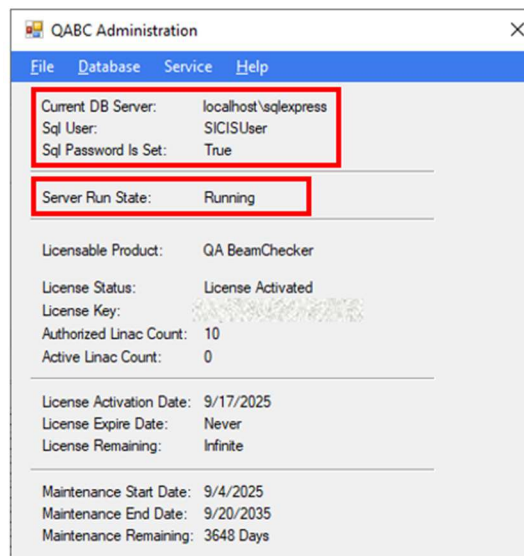
5. When you get a successful test, click "OK" to the message box and continue.



6. Click the "Select" button to save your settings.



7. A popup message will be displayed confirming license activation and the QABC Pro Admin utility will show the service running and the database user set.

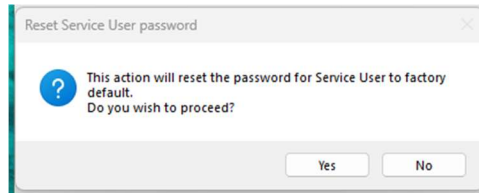


8. QA BeamChecker installation is complete. You can close the QABC Pro Admin utility.

Service User Password Reset

This is in the Database menu and used if the Service User password is lost or forgotten to in order to reset it to the original factory setting.

1. Right click on the QABC Pro Admin Utility icon and select “run as administrator”
2. Select “Yes” on the pop-up message that appears
3. Click on the Database menu and select “Service User Reset”
4. Select “Yes” on the pop-up message.



5. In your browser, navigate to the QABC Pro Application server URL and login as Service using factory setting password “3120”. Change the password as instructed in order to complete login.

Note that the Service user is only used in the Settings menu to add/edit Organization, Clinic and Users in the absence of a user with Physicist Administrator rights.

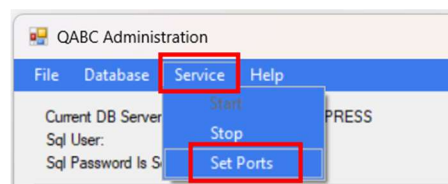
Set Ports

The QABC Pro Application Server reserves Http Port 80 and Https Port 443 automatically by default. These can be changed to different ports assigned by the IT department to avoid conflicts with other products used by the site that also reserve Port 80 and Port 443.

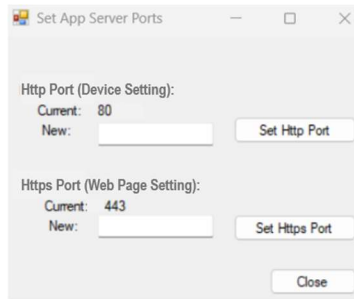
Only Physicist Administrators or custom users with IT settings permissions can change the port settings.

Administrative rights to the QABC Pro Admin Utility are required to change the port settings.

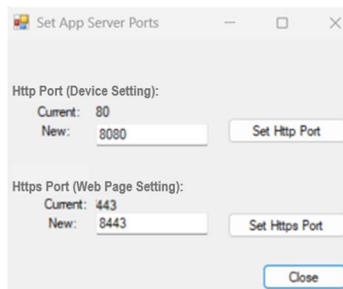
1. Right click on the QABC Pro Admin Utility desktop icon to run it as an administrator.
2. Select the ‘Service’ tab, then ‘Set Ports’



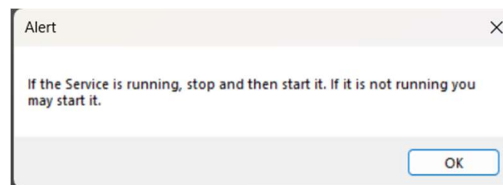
3. Enter the new port number for Http connection and click on ‘Set Http Port’ button to establish the new connection.



4. Enter the new port number for the Https connection and click on the 'Set Https Port' button to establish the new connection.
5. Click 'Close'



6. The Alert message appears to inform the user to check the Service Run state. If running, stop then start it. Or if not running to start it. Click 'OK' to close it.



7. Click 'X' located at the top right to close the QABC Pro Admin Utility being run as an administrator.
8. Double click on the QABC Pro Admin Utility desktop icon to open it as normal user. Wait for the 'Current DB Server' information to populate. Once shown, close the Admin Utility.
9. Verify that the Windows Firewalls are correctly configured for the newly set communication ports (see section 4.4 Windows Firewall Configuration below).
10. To use the web page with the newly set Https communication port, open the Chrome browser and enter the QABC Pro Application Server URL with the added 'xxxx' at the end of the (xxxx being the new Https port number).
For example, the URL using the default port 443 would be:
https://<machine>.<domain>
and the URL using the newly set Https port 1234 would be:
https://<machine>.<domain>:1234
11. The QABC Pro device settings also need to be updated to the newly set Http communication port.
Do this by accessing the Settings menu through the gear icon on the device's touchscreen display. Scroll to the 'AppServer Port Number', tap to view/edit the

number. Enter the chosen Http port number by tapping on each digit and using the up and down arrows to change it. Then use the back arrow '<' to return to the homepage.

Help Menu

The Help menu has 3 selections – About QABC, License, and Export Logs.

1. About QABC displays the current version of the underlying Fission Admin Utility and copyright information.
2. License is used to activate the QABC Pro license. Once activated, it is used to update or release a license as may be needed.
3. Export Logs may be requested by our Customer Care team when needed to troubleshoot Admin Utility issues. Selecting this item will automatically generate the a zip file of the logs, assign a file name in order to save them in a user-selected location.

4.3 Whitelisting License Process

On Windows Server 2019 and newer, some antivirus or endpoint protection solutions may incorrectly flag the LicenseServerProcess.exe component as a potential threat. This is a false positive. In order for the BeamChecker Pro software to function correctly, this file must be excluded (whitelisted) from security scans.

Required Whitelist Entry

The executable to whitelist is located in the BeamChecker service profile under the Windows directory.

The full path is:

C:\Windows\ServiceProfiles\SiBeamChecker\AppData\Local\Temp\Fission\LicenseServerProcess.exe

For environments that use environment variables, the generic form of the path is:

%WINDIR%\ServiceProfiles\SiBeamChecker\AppData\Local\Temp\Fission\LicenseServerProcess.exe

Instructions

1. Open your antivirus or endpoint protection management console.
2. Navigate to the section for exclusions, exceptions, or whitelisting (the name varies by vendor).
3. Add the full path listed above to the exclusions list.
4. Save and apply the configuration.

4.4 Windows Firewall Configuration

In order for QA BeamChecker Pro to function correctly, certain firewall rules must be configured on the Windows Server. These rules allow communication between the application server, client workstations, and the QA BeamChecker Pro device.

Required Ports

- Port 80 (HTTP) – Required for non-SSL client connections.
- Port 443 (HTTPS/SSL) – Required for secure client connections.

- Port 30319 (Device Communication) – Default port used by the QA BeamChecker Pro device. This port is configurable within the device's settings menu.

Windows Firewall Configuration Steps

1. Open the "Windows Defender Firewall with Advanced Security" management console.
 - o Press "Windows Key + R," and type wf.msc, then press Enter.
2. In the left pane, select Inbound Rules.
3. In the right pane, click New Rule....
4. Select Port and click "Next".
5. Choose TCP and specify the port numbers required:
 - o 80, 443, 30319 (or substitute a different port if your device is configured with a non-default value).
6. Click "Next", select Allow the connection, and click "Next".
7. Choose the appropriate profiles (Domain, Private, and/or Public) depending on your network configuration, then click "Next".
8. Provide a descriptive name, such as QA BeamChecker Pro – Inbound Ports, and click "Finish".
9. Outbound rules must also be changed using steps 1-9, except in Step 2. – Select Outbound Rules in the left pane.

Notes

- If outbound rules are restricted in your environment, create corresponding Outbound Rules for the same ports.
- Ensure that any third-party security or endpoint protection software is configured with equivalent exclusions.
- If the default device port (30319) is changed within QA BeamChecker Pro device, you must update the firewall rule accordingly.

5 Getting Started

The QA BeamChecker Pro is designed to offer an integrated solution for linear accelerator daily machine beam QA. This section describes the preparations needed to set up the device and software settings for use. The user needs to set up and align the device on the treatment couch, establish the organizational structure of clinics, machines (linear accelerators), users and devices, and generate acceptable baselines in the software application. Each of these tasks are detailed in this chapter.

Once unboxed, it is highly recommended to charge the QA BeamChecker Pro for at least 8 hours before use. In order to charge the device, the Universal Input Power Supply is either plugged into the QABC Pro device directly, or into the Power/Data Cradle with the QABC Pro placed on it.

5.1 Software Settings

The QABC Pro application software is accessible through a web client interface using the URL established at time of software and database installation. All settings can be configured except for Devices before hardware is set up for data acquisition following these instructions.

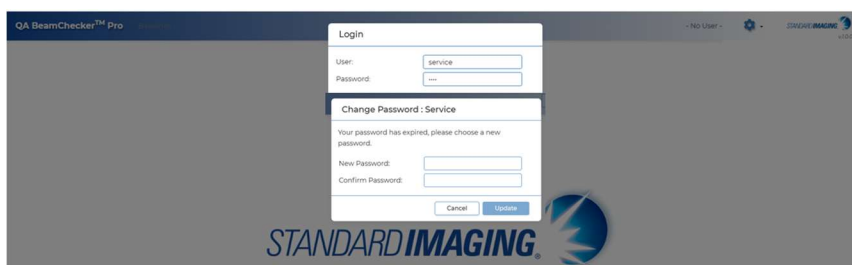
Using the Chrome browser, navigate to 'https://servercomputername/' where the "servercomputername" is the real name or alias of the server computer where the QA BeamChecker Pro Application Server (QABCP-AS) is installed

Initial Login

Initially the homepage Login message will be auto-populated with

user: service
password: ****.

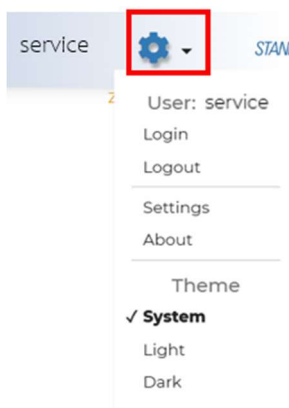
You **must** change the password before any other action. The new password must be at least eight (8) characters in length.



This Service user login grants access to the software Settings menu items Organization, Users, and Active Directory (LDAP). At a minimum, the top tier of the Organization and a User with role type Physicist Administrator assigned to the top tier Organization need to be created using the Service user login. The rest of the organization's management nodes, clinic nodes, users, and the Active Directory service account may be, but are not required to be, created using the Service user login.

The Service user does not have the necessary permissions to add/edit Machines or Devices. These will need to be created by a user with these permissions – see Users below for more details.

For first login as the Service user, subsequently as user with physicist administrator rights, go to the gear icon and select Settings from the dropdown menu to begin.



Settings - Organization

The QA BeamChecker Pro and its accompanying software are designed to be scalable to apply from single-clinic organizations to large, multi-tiered hierarchical hospital systems. The first

step in the process for all types hospital/clinic systems is to select the Organization button within the Settings menu.

1. A default generic “Organization” is shown. This is the highest level of organizational management.

2. Click on ‘Organization’ at left to activate Organization information input fields. Replace the default Organization Name with the hospital organization’s name (required field), and add more details about the organization using the other input fields, then click the Save button.

3. If creating a multi-tiered hospital organization, add tier(s) under the purview of the top organization level by clicking on the ‘+’ symbol to the right of the Organization name and selecting ‘Add Mgmt’.

If this is a single tier organization, skip to the “Organization- Clinics” section below.

4. Enter a Management Name, as required, and additional information as desired, then click Save.

5. Repeat steps 3 & 4 until all second tier management nodes directly under controlling management of the top level organization are created.
6. To add a third tier subordinate management node controlled by those second tier nodes created in steps 3-5, select the management node name by clicking on it, then click on the '+' and select 'Add Mgmt'. Enter the third tier subordinate management name and other information as needed in the fields at right.

7. Repeat Step 6 until all third tier subordinate management nodes are added to its second tier controlling management.
8. Add additional subordinate management tiers beneath their controlling management node until all levels of the organization are created, using the "Add Mgmt" selection under the "+" symbol.

Organization - Clinics

The next step is to create clinics within each management node. For a single tier organization with one or more clinics within it, click on the '+' symbol and select 'Add Clinic'.

For larger organizations, clinics are added directly under their controlling management tier for each clinic. For initial setup, this is done using the Service user. After initial setup, clinics can be created or edited by authorized users only.

1. Select the controlling management tier, then click on the '+' symbol to the right and select 'Add Clinic'.

QA BeamChecker™ Pro Baselines Real-Time Analysis Physics SI HQ Clinic Chief MP

ORGANIZATION

MACHINES

USERS

DEVICES

ACTIVE DIRECTORY

Setup Organization

Active Archived

Top Level Organization + -

SI HQ Region Add Mgmt

SI HQ Clinic Add Clinic

TEST AZ Clinic

Beloit Cancer Center

Organization Name: Top Level Organization Chief MP - PhysAdmin

Street Address:

Street Address 2:

Province/Region:

ZIP/Postal Code:

Country:

Cancel Save

2. Enter the 'Clinic Name'.
3. Select the correct time zone for the clinic from the drop down menu. The selected time zone will be used to timestamp all data acquired in the clinic's local time zone. This is a required field.

QA BeamChecker™ Pro Baselines Real-Time Analysis Physics SI HQ Clinic Chief MP

ORGANIZATION

MACHINES

USERS

DEVICES

ACTIVE DIRECTORY

Setup Organization

Active Archived

Top Level Organization + -

Single Clinic Org site

Controlling Management: Top Level Organization

Clinic Name: Single Clinic Org site Chief MP - PhysAdmin

Clinic Abbreviation:

Street Address:

Street Address 2:

City:

State/Province/Region:

ZIP/Postal Code:

Country:

TimeZone: America/Chicago

Cancel Save

4. The remaining input fields are optional, complete as deemed necessary.
5. Add clinics under each management tier (node) as needed by selecting the management tier name and then the '+' symbol > 'Add Clinic'.

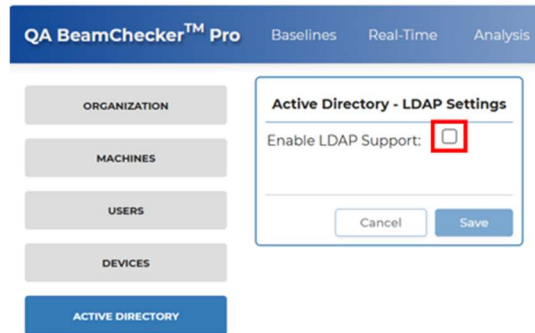
To archive a Clinic, click on the "Bank Box" icon next to the clinic to be archived. An archived Clinic can be un-archived by clicking on the Archived tab in the Setup Organization dialog box and selecting the Clinic to be returned to the active list of clinics.

Note: In order to archive a Clinic, all Machines (linacs) assigned to the clinic must first be archived as an archived clinical cannot have any active Machines.

Active Directory

This will allow the use of domain credentials to be used to retrieve user accounts and authenticate logins.

1. Select the Active Directory button, then tick the box 'Enable LDAP Support'.



2. A dialog box will open for entering LDAP (Lightweight Directory Access Protocol) parameters.

Service Username

The Active Directory account used by BeamChecker to query the directory.

- o This is a **service account**, not an end-user account.
- o The account must have permission to read user objects and attributes.
- o Typically entered as a User Principal Name (UPN), for example:

ldapfission@standardimaging.com

Service Password

The password for the service account above.

This credential is stored securely and used only to perform directory searches.

Host

The DNS name or IP address of the Active Directory domain controller.

Example: standardimaging.com

Port

The LDAP port used to connect to Active Directory.

- o 389 - Standard LDAP (optionally upgraded to TLS)
- o 636 - LDAPS (LDAP over SSL)

Ensure this port is reachable from the BeamChecker Pro server.

Search Base

The base Distinguished Name (DN) where user searches will begin.

This should typically be the root of your domain or an organizational unit (OU) containing users.

Example: DC=standardimaging, DC=com

Search Filter

The LDAP filter used to locate a user account during login.

Use *MatchValue* as a placeholder for the value entered by the user at the login screen.

At runtime, this placeholder is replaced with the user's login identifier.

Example configuration: userPrincipalName=*MatchValue*

Example at login (user enters bob@example.com):

userPrincipalName=bob@example.com

Display Field Name

The attribute used for the user's full, friendly display name.

Username Field

The attribute treated as the user's unique login identifier.

This value must match what users enter on the login screen.

Email Field (optional)

The attribute used for the user's email address.

Phone Number Field (optional)

The attribute used to populate the user's phone number, if available.

Title Field

The attribute used for the user's job title or role.

3. Click on the Save button.
4. Once saved, click on the 'Test Settings' button to confirm all inputs have been correctly entered and the connection to the organization's LDAP is made. A pop-up message will confirm if the test passed.

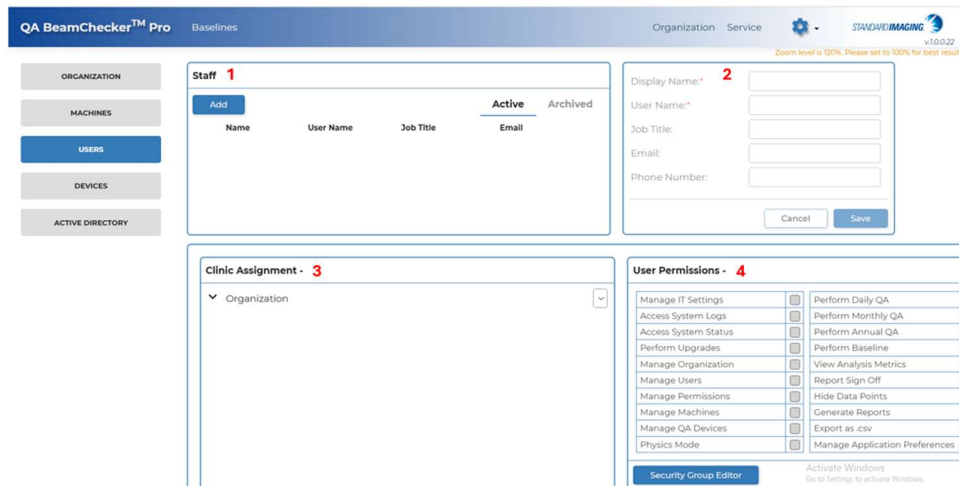


Users

The Users section is the location where Staff, Management and Clinic Assignments, and user permissions are created/edited.

There are four distinct areas on this page, each further described below.

- 1) Staff
- 2) User Entry
- 3) Clinic Assignment
- 4) User Permissions



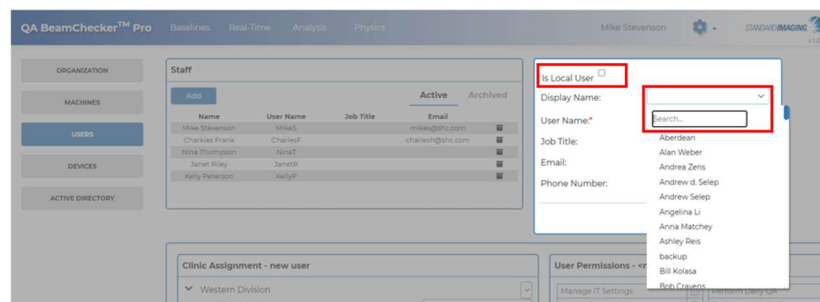
Staff and User Entry

The Service user login should be used to add the Physicist Administrator(s) at the **highest** level of the organizational hierarchy first. Only Physicist Administrators at the top level have full rights throughout the entire organization to create/edit management tiers, clinics, machines, and users at any level.

1. In the Staff box, click the “Add” button to activate the User Entry section to the right.

If Active Directory is enabled -

- a. In the User Entry section, uncheck the box by 'Is Local User' so that the dropdown menu becomes available in the Display Name field.
- b. Either scroll through the list to select a staff member, or enter something in the Search box to narrow the list.
- c. Click on desired name from the list and the Display Name, User Name, and password will auto-populated.
- d. Job Title, Email and Phone Number will also auto-populate if that information is part of the Active Directory record. If not, then they can be manually entered if necessary.
- e. Click 'Save'.



If Active Directory is not enabled -

- a. In the User Entry section, complete the required fields
The Display Name shows who performed a function such as baseline creation, measurement, or comment. It is also included in PDF reports and .csv export files.
The User Name is used to log into the software application.

- These may be the same.
- Complete optional fields as deemed necessary.
 - Click 'Save'

Staff

Add Active Archived

Name	User Name	Job Title	Email
Mike Stevenson	MikeS		mikes@shc.com
Charles Frank	CharlesF		charlesh@shc.com
Nina Thompson	NinaT		
Janet Riley	JanetR		
Kelly Peterson	KellyP		

Display Name:* new user

User Name:*

Password:*

Job Title:

Email:

Phone Number:

Cancel Save

If Active Directory is enabled, but a temporary user needs to be added (e.g. a locum physicist) -

- In the User Entry Section, tick the box for 'Is Local User'.
- In the User Entry section, complete the required fields
The Display Name shows who performed a function such as baseline creation, measurement, or comment. It is also included in PDF reports and .csv export files.
The User Name is used to log into the software application.
These may be the same.
- Complete optional fields as deemed necessary.
- Click 'Save'

Staff

Add Active Archived

Name	User Name	Job Title	Email
AZens	AZens	Phys Admin	
Chief MP	Chief MP	Phys Administrator	
physicist	physicist	Authorized Phys.	
Carla	Carla	Lead Therapist	
Andrew	Andrew	phys admin	

Is Local User ☒

Display Name:* Johnny Locum

User Name:* JLocum

Password:*

Job Title: Locum Physicist

Email:

Phone Number:

Cancel Save

- To edit User information, click on the user name in the Staff list and the User Entry section is re-activated. Edit details as needed and Save.
- To change a user's password, click on the user name in the Staff list and then click the "Change Password" button. The change password dialog box is activated. Enter and confirm the new password, then Save.

Staff

Add Active Archived

Name	User Name	Job Title	Email
Mike Stevenson	MikeS		mikes@shc.com
Charles Frank	CharlesF		charlesh@shc.com
Nina Thompson	NinaT		
Janet Riley	JanetR		
Kelly Peterson	KellyP		

Display Name:* Mike Stevenson

User Name:* MikeS

Job Title:

Email: mikes@shc.com

Phone Number: 555-654-9977

Change Password

Cancel Save

Change Password

Password:*

Confirm Password:

Cancel Save

Clinic and Security Group Assignment

Once a staff member has been created, they will need to be assigned to at least one clinic within the organization using the Clinic Assignment box.

There are four pre-set security groups – Physicist Administrator, Authorized Physicist, Physicist, and Therapist. Instructions for creating custom Security Groups are at the end of this section.

Activity	Physicist Administrator (PhysAdmin)	Authorized Physicist (PhysAuth)	Physicist	Therapist
IT Settings	X			
System Logs	X			
System Status	X			
Can create and manage an organization	X			
Can create and manage users	X			
Can create and manage user authority and permissions	X			
Can create and manage (treatment) machines	X	X		
Can create and manage QA devices	X	X		
Can operate the system in manual and/or physics mode	X	X	X	
Can perform daily QA measurements	X	X	X	X
Can perform monthly QA measurements	X	X	X	
Can perform annual QA measurements	X	X	X	
Can perform a baseline	X	X	X	
Can view analysis metrics	X	X	X	X
Has report sign off authority	X	X		
Can hide data points	X	X		
Can generate reports	X	X	X	
Can export data as .CSV	X	X	X	X
Can manage application preferences	X	X	X	
Can unarchive machines locked out by other users	X	X	X	
Can perform upgrades.	X			

The User Permissions are displayed as follows:

Clinic Assignment - PhysicsAdmin

Western Division

Physicist Administrator

Midvale Clinic

Physicist Administrator

Mayberry Clinic

Physicist Administrator

Reeds Clinic

Physicist Administrator

User Permissions - Physicist Administrator

Manage IT Settings	☒	Perform Daily QA	☒
Access System Logs	☒	Perform Monthly QA	☒
Access System Status	☒	Perform Annual QA	☒
Perform Upgrades	☒	Perform Baseline	☒
Manage Organization	☒	View Analysis Metrics	☒
Manage Users	☒	Report Sign Off	☒
Manage Permissions	☒	Hide Data Points	☒
Manage Machines	☒	Generate Reports	☒
Manage QA Devices	☒	Export as .csv	☒
Physics Mode	☒	Manage Application Preferences	☒

Security Group Editor

Physicist Administrator Security Group Pre-set Permissions

Clinic Assignment - AuthPhysicist

Western Division

Authorized Physicist

Midvale Clinic

Authorized Physicist

Mayberry Clinic

Authorized Physicist

Reeds Clinic

Authorized Physicist

User Permissions - Authorized Physicist

Manage IT Settings	☐	Perform Daily QA	☒
Access System Logs	☐	Perform Monthly QA	☒
Access System Status	☐	Perform Annual QA	☒
Perform Upgrades	☐	Perform Baseline	☒
Manage Organization	☐	View Analysis Metrics	☒
Manage Users	☐	Report Sign Off	☒
Manage Permissions	☐	Hide Data Points	☒
Manage Machines	☒	Generate Reports	☒
Manage QA Devices	☒	Export as .csv	☒
Physics Mode	☒	Manage Application Preferences	☒

Security Group Editor

Authorized Physicist Security Group Pre-set Permissions

Clinic Assignment - physicist

Western Division

Physicist

Midvale Clinic

Physicist

Mayberry Clinic

Physicist

Reeds Clinic

Physicist

User Permissions - Physicist

Manage IT Settings	☐	Perform Daily QA	☒
Access System Logs	☐	Perform Monthly QA	☒
Access System Status	☐	Perform Annual QA	☒
Perform Upgrades	☐	Perform Baseline	☒
Manage Organization	☐	View Analysis Metrics	☒
Manage Users	☐	Report Sign Off	☐
Manage Permissions	☐	Hide Data Points	☐
Manage Machines	☐	Generate Reports	☒
Manage QA Devices	☐	Export as .csv	☒
Physics Mode	☒	Manage Application Preferences	☒

Security Group Editor

Physicist Security Group Pre-set Permissions

Clinic Assignment - therapist		User Permissions - Therapist	
Western Division	Therapist	Manage IT Settings	☐
Midvale Clinic	Therapist	Access System Logs	☐
Mayberry Clinic	Therapist	Access System Status	☐
Reeds Clinic	Therapist	Perform Upgrades	☐
		Manage Organization	☐
		Manage Users	☐
		Manage Permissions	☐
		Manage Machines	☐
		Manage QA Devices	☐
		Physics Mode	☐
		Perform Daily QA	☒
		Perform Monthly QA	☐
		Perform Annual QA	☐
		Perform Baseline	☐
		View Analysis Metrics	☒
		Report Sign Off	☐
		Hide Data Points	☐
		Generate Reports	☐
		Export as .csv	☒
		Manage Application Preferences	☐

Therapist Security Group Pre-set Permissions

Assigning a user as a Physicist Administrator to a subset of the entire organization will limit their ability to add or edit clinics, machines and users to only those places they are assigned.

Likewise, staff members assigned to other roles at specific locations will only be able to view Settings information for their assigned locations.

Example 1: AZ CMP has been assigned to the Physicist Administrator Security Group at the top level of the organization and all management tiers and clinics (i.e. Child Nodes) within the organization.

The screenshot displays the QA BeamChecker Pro interface. On the left, a sidebar shows the 'ORGANIZATION' menu. The main area is divided into two sections: 'Setup Organization' and 'Staff'.

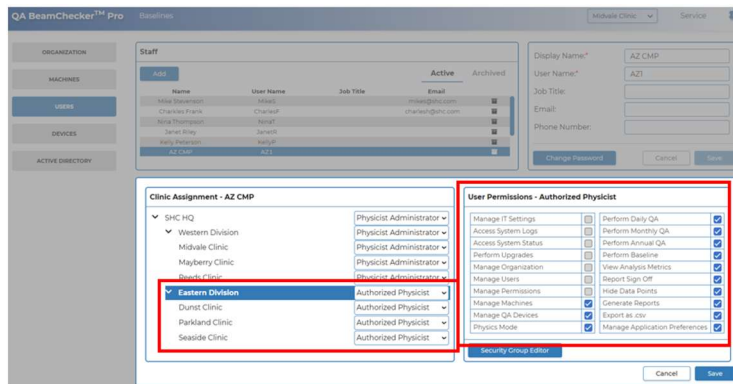
Setup Organization: The 'Active' tab is selected. Under 'SHC HQ', a list of clinics is shown: Western Division, Midvale Clinic, Mayberry Clinic, Reeds Clinic, Eastern Division, Dunst Clinic, Parkland Clinic, and Seaside Clinic. The 'Organization Name' field is set to 'SHC HQ', and the 'Display Name' field is set to 'AZ CMP - PhysAdmin'.

Staff: The 'Active' tab is selected. A table lists staff members: Mike Stevenson, Charles Frank, Nina Thompson, Janet Riley, Kelly Peterson, and AZ CMP. The 'AZ CMP' entry is highlighted, showing the role 'Physicist Administrator'.

User Permissions - Physicist Administrator: A table shows permissions for the 'Physicist Administrator' role. All permissions are checked, including 'Manage IT Settings', 'Access System Logs', 'Access System Status', 'Perform Upgrades', 'Manage Organization', 'Manage Users', 'Manage Permissions', 'Manage Machines', 'Manage QA Devices', 'Physics Mode', 'Perform Daily QA', 'Perform Monthly QA', 'Perform Annual QA', 'Perform Baseline', 'View Analysis Metrics', 'Report Sign Off', 'Hide Data Points', 'Generate Reports', 'Export as .csv', and 'Manage Application Preferences'.

Same Security Group assignment at all levels

Example 2: AZ CMP has been assigned Physicist Administrator Security Group for SHC HQ but only as an Authorized Physicist for the Eastern Division, so no longer has rights to add/edit clinics or users to the Eastern Division.



Different Security Group assignment by Division

Note: If a Physicist Administrator is not properly set up, the Service user login is required to make corrections.

1. Select a Staff members by clicking on their name, this will activate the other sections of the page, including the Clinic Assignment Window section where the management organization hierarchy is displayed. The default assignment is 'None' to start.

Staff				
Add				
Name	User Name	Job Title	Email	
AZens	AZens	Phys Admin		
Chief MP	Chief MP	Phys Administrator		
physicist	physicist	Authorized Phys		
Carla	Carla	Lead Therapist		
sihq	sihq	phys admin		
Andrew	Andrew			

Clinic Assignment - Andrew		User Permissions - Authorized Physicist
SI HQ	-- None --	Manage IT Settings
Central Region	-- None --	Access System
City Center	-- None --	Access System
Sun Prairie Clinic	-- None --	Perform Upgr
Southern Region	-- None --	Manage Organ
South Street HQ	-- None --	Manage Users
		Manage Permi

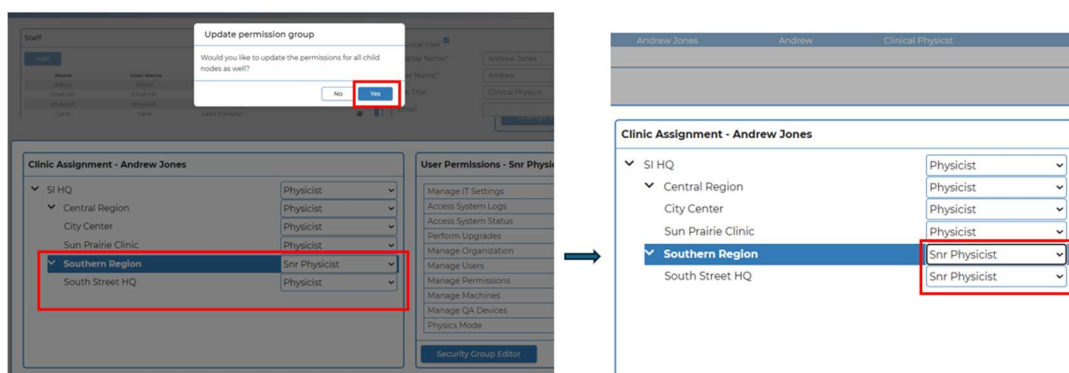
2. Select the appropriate Security Group for the top level displayed from the dropdown list(first item in the list). Note that this could remain 'None' in order to customize their view upon login. The role selected for the top item will automatically be the default selection for all rest of the organization.

Clinic Assignment - Andrew Jones	
SI HQ	-- None --
Central Region	-- None --
City Center	-- None --
Sun Prairie Clinic	-- None --
Southern Region	-- None --
South Street HQ	-- None --

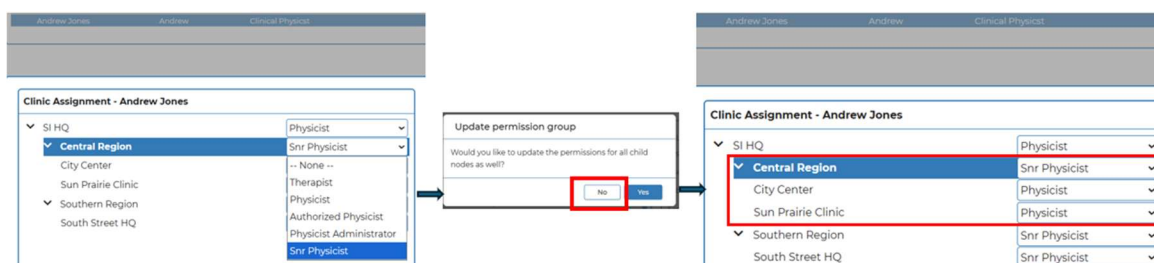
→

Clinic Assignment - Andrew Jones	
SI HQ	Physicist
Central Region	Physicist
City Center	Physicist
Sun Prairie Clinic	Physicist
Southern Region	Physicist
South Street HQ	Physicist

- To customize by management tier, select the user role type that applies for that staff member at that management level, and select 'Yes' on the pop-up window to update the permissions for all child nodes.

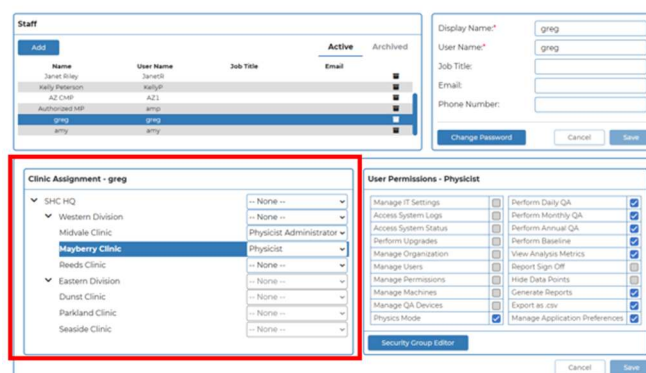


- To customize a staff member's role at management tier, select 'No' to the pop-up window. The assignment at each location within that management tier can now be set individually.

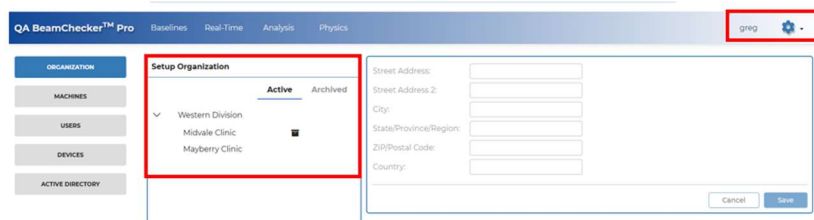


- Once a staff member's clinical assignments have been set, that user will only see what is relevant to them upon login.

Example: Greg's Security Group settings have been created by AZ Chief MP



Clinical Assignment and Security Group settings for User Greg

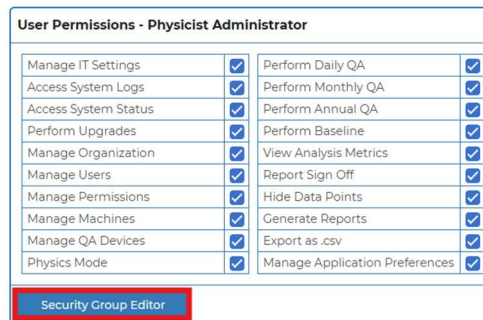


Logged-in User Greg's View of the Organization in Settings

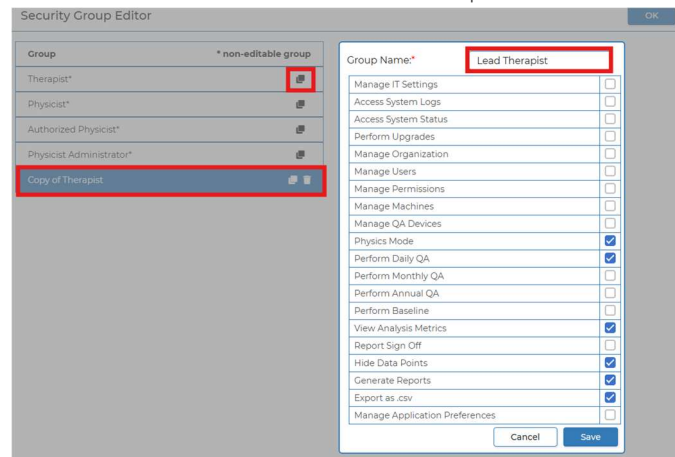
Security Group Editor

It is possible for users with Physicist Administrator privileges at management hierarchy levels, not at individual clinic level, to create custom Security Groups using the Security Group Editor.

1. Click on the Security Group Editor Button.



2. Select one of the four pre-set permissions groups to copy by clicking on the copy icon.
3. It is required to enter the new Group Name in the input field in the upper right.
4. Check any additional permission boxes that the new group should have.
5. Uncheck the boxes to deselect permissions.
6. Click the Save button when satisfied with the edited permissions.



7. Click 'OK' and then new role with these custom user permissions will appear as a selection in the dropdown menu for Clinic Assignment.

Machines (Linacs)

Linear accelerators are defined as Machines within QABC Pro software settings. Clinics must be created prior to adding machines so that they can be associated with the correct clinic location. Only Physicist Administrator or Authorized Physicist staff have permission to add/edit Machines.

In the Settings > Machines tab, use the following steps to create a new Machine or edit an existing one.

1. Select the location for the Machine by clicking on a Clinic name within the Add/Edit Machines section of the page. Then click on the '+' symbol, then select 'Add Machine' to activate the input fields at right.

2. Enter Display Name (required), then add the manufacturer, model and serial number if desired.
3. Select the Machine Type 'Linac' by clicking on the radial button to the left of Linac.
4. The SSD field is set to 100 cm by default, review and update as needed for machine being created/edited.

5. Add each energy by clicking on '+ Add Energy' then use the up/down arrows to select an energy value or enter the energy value, then select "MeV", "MV" or "FFF" from the dropdown menu. Repeat until all energies to be tested are created. Saved energies will be added to the Energy parameter dropdown menu for baseline creation.

Note: Energies may be deleted by an authorized user by clicking on the linac name, then by clicking on the radial button to the right of the energy to be deleted, then selecting Save.

6. Tick the check box to the left of the available wedge angles that will be part of routine QA. Selected wedges will be added wedge angle parameter dropdown menu for baseline creation.
7. To add comments, click the '+' and enter the comment. Each Comment entered will be saved with input user's name and be timestamped. Comments become part of the permanent Machine record so cannot be deleted once saved.

To archive a Machine should it be decommissioned, click on the 'Bank Box' icon next to the machine to be archived. Click on 'OK' to confirm. Archiving a machine keeps its historical QA records and removes it from the active machines list.

Users and Machines are communicated from the software application to the device once an ethernet or Wi-Fi connection is established. Use the device touchscreen to select the user and then the machine for Standalone Mode operation.

Devices (QA BeamChecker Pro)

The initial setup of the device requires an ethernet connection between the device and the QA BC Pro application software. After the device has been registered in the application software, ethernet or Wi-Fi connection is used to establish baselines, use Real-Time Mode or Physics Mode. After baselines have been established, the device is ready for software-free, cable-free Standalone Mode operation.

Initial Device Setup

1. Place the QA BeamChecker Pro on the treatment couch.
2. Connect the ethernet cable to both the device and the computer connected to the QABC Pro Application Server.
3. Turn the device on, and use the touchscreen display to confirm communications settings (as noted in Section 3.3 - Touchscreen Display Settings and Controls - Settings above).
4. Exit the treatment room. The door can stay open since no radiation delivery is required for device registration.

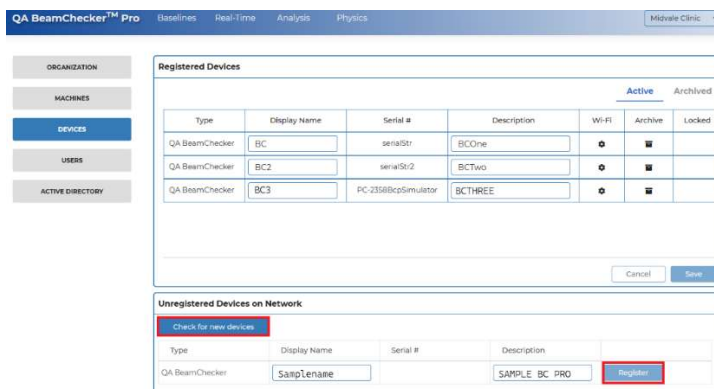
Device Registration

Before device registration can occur, the user must select a clinic in the top menu bar before navigating to the Settings menu.



Within Settings, select the 'Devices' button for device registration.

1. Click on 'Check for new devices' button and the new device will appear in the Unregistered Devices on Network section with only the Device Type and Serial # field entries.



2. Enter a Display Name. This is a required field since this information is communicated to the device for Standalone operation. It is also used for selection purposes and reporting within the application software. Once entered, the Register button becomes active.
3. Enter an optional Description for added detail about the device if desired.

- Click on 'Register' and the device information will then appear in the list of Registered Devices as 'online'.

Type	Display Name	Serial #	Description	Config	Active	Archived	Locked
QA BeamChecker	SI HQ Unit	Hugh0007	SI HQ Unit	•	■		
QA BeamChecker	BT Unit 2	AH25B002	BT Unit 2	•	■		
QA BeamChecker	R&D Unit	AH249991	C.L. R&D	•	Online		

- Once the device is registered for the first time, or is returned to the user after a service event, it needs to be synchronized to the user's QABC Pro Application Server. The synchronization is a transfer of information (users, machines, and baselines) from the QABC Pro Application Server to the device's internal memory. Once the initial or post-service synchronization is done, the system will automatically check for new data and synchronize as needed.

Click on the gear icon to Synchronize the device to the QABC Pro Application Server. Click 'OK' when it shows 'Synchronize Complete'.

- If Wi-Fi is available in the treatment room and/or console area, use the gear icon to add the Wi-Fi access point(s) and password(s) in order to be able to Wi-Fi communication to connect to the application software and transfer data acquired in Standalone mode to the database. Click 'OK' when done.

This information can be added/edited as needed in the future.

- Exit Settings in order to acquire baselines and measurements.

Data Access

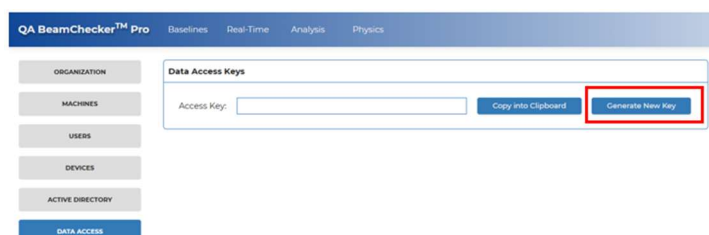
The QABC Pro software application contains Data-Access API Module that allows approved external applications to access some of the measurement data stored in the database. This module is licensed separately. Currently, QA Pilot (Standard Imaging, Inc.) and Total QA (Image Owl Inc.) are supported applications.

When the Data Access Module is active the Data Access button is selectable in the Settings menu.

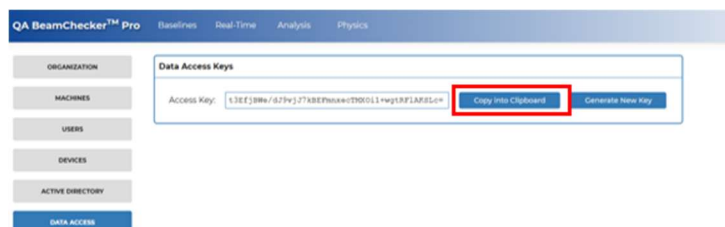
1. Click on the Data Access menu button in the Settings menu



2. Click on the Generate New Key button



3. Copy the key to in order to provide this information to the external application.



There is only one active API key at a time, so if a new API key is generated, it needs to be sent to the intended external application.

5.2 Hardware Setup

The setup described below applies to when the device is required to be connected to the application software. First-time use of the product, Baselines, Real-Time, and Physics Modes use this setup.

Standalone Mode setup and operation using automatic energy detection and device internal memory is described in Chapter 6 Routine Measurement – Standalone Mode.

1. Set the QABC Pro device on the treatment table at the appropriate SSD based on linac type.
2. Align the device using the light field and device alignment lines to a 10x10 cm or 20x20 cm field.

3. Battery power is standard, however, should a power connection be required due to a low battery, connect the power supply to the device 9 VDC input and plug it in to a grounded electrical outlet. The device has about eight (8) hours of battery use before a recharge is required.

4. Connect the Ethernet cable to the device ethernet port and to the network or computer ethernet port. Alternatively, connect via Wi-Fi if available in the vault.

An ethernet or Wi-Fi connection to the software is required for establishing baselines, using Real-Time and Physics Modes.

5. Turn on the device and it will perform a Power On Self-Test (POST) to verify that device passes internal diagnostic tests before operation of the device.

If any portion of POST fails, the error will be displayed on the front panel (see Troubleshooting for full details).



6. When POST is completed, the display is set to the home screen.



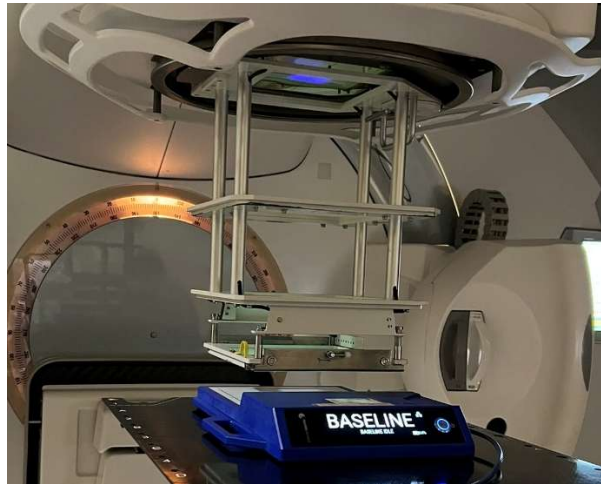
7. Verify communication settings via the gear icon on the device. Then return to the homepage using the home icon. (for more information about device settings, see section 3.4 Touchscreen Display Settings and Controls).
8. Leave the device on the Homepage and exit the treatment room.

5.3 Baseline Acquisition

Routine testing of beam energy parameters requires establishing baselines for each energy for a specific linac and device combination. Once established, each baseline serves as a comparative benchmark for subsequent measurements. Baseline parameters include baseline name, beam type, energy, SSD, wedge, gantry angle, field size, monitor units, expected output, dose, and dose rate.

Baselines should be acquired at roughly the same time of day as morning daily QA is performed. For instance, if the daily measurement is regularly performed at 7:00 am, the baseline should be taken at a similar time.

1. Set up the device as noted in the preceding section, 5.2 Hardware Setup.

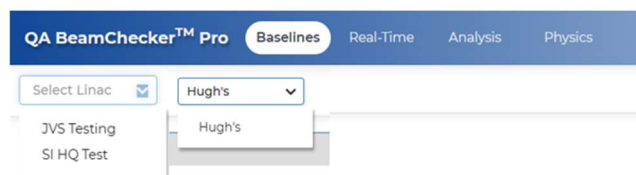


Typical QA BeamChecker Pro Ethernet Setup for Baselineing

2. Using the Chrome browser, navigate to the QA BeamChecker Pro software webpage.
3. Log in and select Clinic at the top of the menu bar.



4. Select the Baselines Tab at the top of the screen. Then select the linac, and desired online BeamChecker Pro Device from the pulldown menus. This creates the specific linac and device combination.



5. Click the “Add Baseline” button to activate the baseline parameters portion of the screen and enter, or select a value if a dropdown menu is available, for each input field. The minimum dose rate is 50 cGy/minute.

Add Baseline : SI HQ Varian TB - R&D Unit

Baseline Name:

Beam Type:

Energy:

SSD:

Wedge:

Gantry Angle:

Field Size:

Monitor Units:

Expected Output:

Dose:

Dose Rate:

Metric	Alert	Error
Constancy:	3 %	5 %
Axial Sym:	3 %	5 %
Transverse Sym:	3 %	5 %
Flatness:	3 %	5 %
All Other:	3 %	5 %

Notes:

Add Baseline : SI HQ Varian TB - R&D Unit

Baseline Name: 6 MV_20x20

Beam Type: Static

Energy: 6 MV

SSD: 100 cm

Wedge: None

Gantry Angle: 0 °

Field Size: 20 x 20

Monitor Units: 100 MU

Expected Output: 100 %

Dose: 100 cGy

Dose Rate: 600 MU/min

Metric	Alert	Error
Constancy:	3 %	5 %
Axial Sym:	3 %	5 %
Transverse Sym:	3 %	5 %
Flatness:	3 %	5 %
All Other:	3 %	5 %

Notes:

Start ● Device Ready

6. The Metrics Alert and Error thresholds are automatically populated with 3% and 5% respectively. Update as needed according to clinical protocol.
7. Enter any Notes that are needed for the historical record (optional).
8. **Carefully review all field entries for the baseline parameters since these cannot be edited once the baseline is accepted.**
9. Once all required fields entries are completed, the “Start” button will be activated. Click ‘Start’. The device will initialize, then zero, then the status square will change from **orange** to **green** and ‘Ready for Beam’ is displayed. Deliver the beam that matches the energy parameters listed.

Add Baseline : TrueBeam - BC PRO SI

Baseline Name:

Beam Type:

Energy:

SSD:

Wedge:

Gantry Angle:

Field Size:

Monitor Units:

Expected Output:

Dose:

Dose Rate:

Metric	Alert	Error
Constancy:	3 %	5 %
Axial Sym:	3 %	5 %
Transverse Sym:	3 %	5 %
Flatness:	3 %	5 %
All Other:	3 %	5 %

Notes:

Copy Baseline : JVS Testing - Hugh's

Baseline Name: 6MV static 20x20 D/F

Beam Type: Static

Energy: 6 MV

SSD: 100 cm

Wedge: None

Gantry Angle: 0

Field Size: 20 x 20

Monitor Units: 100 MU

Expected Output: 100 %

Dose: 100 cGy

Dose Rate: 600 MU/min

Metric	Alert	Error
Constancy:	3 %	5 %
Axial Sym:	3 %	5 %
Transverse Sym:	3 %	5 %
Flatness:	3 %	5 %
All Other:	3 %	5 %

Notes: 6MV 20x20 static

Start ● Device Ready

The device touchscreen display shows each stage of the process in real time, ending with ‘Baseline Complete’. Aim the room camera at the device display to easily view the device status throughout the process.

10. The device automatically triggers to begin the measurement when the beam delivery is started.
11. Baseline results will be displayed once beam delivery is completed. If the baseline is acceptable, click “Accept baseline”. Alternatively, click “Discard Baseline” to remeasure the baseline , or click “Cancel” to exit back to the main workspace.

Add Baseline : TrueBeam - QA BC Pro!

Baseline Name: 20x20 6MV Static
Beam Type: Static
Energy: 6 MV
SSD: 100 cm
Wedge: None
Gantry Angle: 0 °
Field Size: 20 x 20
Monitor Units: 100 MU
Expected Output: 100 %
Dose: 100 cGy
Dose Rate: 400 MU/min
Metric: Alert Error
Consistency: 3 % 5 %
Axial Sym: 3 % 5 %
Transverse Sym: 3 % 5 %
Flatness: 3 % 5 %
All Other: 3 % 5 %
Notes:

Start

Device Ready

Metric: Measured

Constancy: -0.82
Axial Symmetry: -0.93
Transverse Symmetry: 114
Flatness: 114

Ambient Pressure: 725.21 mmHg
Internal Temperature: 22.05 °C

Chamber Value (pC)

Accept Baseline Discard Baseline Cancel

12. Repeat Steps 5-10 to manually create additional baselines.

Copy Baseline

The 'Copy Baseline' button expedites the creation of additional baselines by repopulating the parameters of an existing baseline to be minimally edited. The Baseline Name and at least one parameter must be changed in order to be able to save a new and different baseline.

QA BeamChecker™ Pro Baseline Beam Type Energy Wedge

NO Category Select

Baselines

Name	Max. MU	Date Created	Beam Type	Energy	Wedge	Axis Output (cGy)	Dose Rate (MU/min)	Field Size (cm)	Gantry Angle (deg)	SSD (cm)
6 MV_20x20	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	20.00 x 20.00	0.00	100.00
6 MV_10x10	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	10.00 x 10.00	0.00	100.00
6 MV_15x15	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	15.00 x 15.00	0.00	100.00
6 MV_10x15	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	10.00 x 15.00	0.00	100.00
6 MV_15x10	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	15.00 x 10.00	0.00	100.00
6 MV_10x20	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	10.00 x 20.00	0.00	100.00
6 MV_20x10	100	11-18-2018 10:10:10 AM	Static	6 MV	None	100.00	400.00	20.00 x 10.00	0.00	100.00

Metric: Measured

Consistency: 3.0% 5.0%
Axial Symmetry: 0.82 5.0%
Transverse Symmetry: 114 5.0%
Flatness: 1.15 5.0%

Internal Temperature: 22.1 °C
Pressure: 725.21 mmHg

Chamber Value (pC)

For example:

1. Create a baseline with the name: 6 MV_20x20 baseline.
2. Highlight the 6 MV baseline to activate the 'Copy Baseline' button.
3. Change the Baseline Name to 10 MV_20x20 and select 10 MV from the Energy dropdown.
4. Click 'Start' and when ready deliver the 10 MV beam.
5. Review select the Accept Baseline to save it, or Discard Baseline to redo the measurement.
6. Repeat steps 1-5 until all baselines are created.

Note: Carefully review all parameters and tolerances before accepting a baseline as these are non-editable fields once the baseline is saved.

Re-Baseline

The QA BeamChecker Pro baselines will need to be redone after annual QA or field service events occur. Use the following steps to perform the re-baseline:

1. Click on a baseline name to select it from the list.
2. Select the 'Re-Baseline' button.
3. The original baseline parameters will be displayed at left.

Note that only the 'Alert' and 'Error' thresholds and 'Notes' are the only editable fields during a re-baseline action.

4. Click the 'Start' button and when the button is green and states 'Waiting for beam' deliver that energy.
5. Use the 'Notes' field to enter information pertaining to the re-baseline measurement.
6. Review the newly acquired baseline in order to accept it, discard it to retake the measurement, or cancel to exit the workspace.
7. Repeat steps 1-5 until all baselines have been re-baselined.

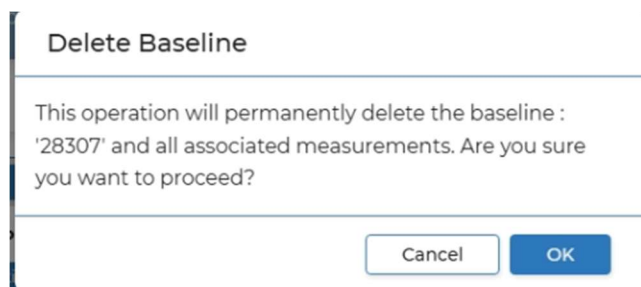
When a re-baseline has occurred, it will be denoted in the trending graphs with a vertical blue line on the date it was done. This information is saved to the database reported in the .csv export files.

The .csv export file will contain recorded re-baseline measurements with Notes attached.

Delete Baseline

Proceed with caution to determine if an existing baseline should be deleted as it will remove all measurements taken against it and **cannot be undone**. That said, if a baseline name or parameter is entered incorrectly and the user wants it removed, this can be done via the 'Delete Baseline' but function by following these steps:

1. Click on a baseline name to select it from the list.
2. Select the 'Delete Baseline' button.
3. A warning is displayed that must be confirmed to continue the deletion process.



4. Click 'OK' to proceed to deletion or 'Cancel' to exit.

It will take a few seconds for the deletion and re-synchronization of the device to be completed by the system. The UI will be greyed out, no actions allowed, during this time.

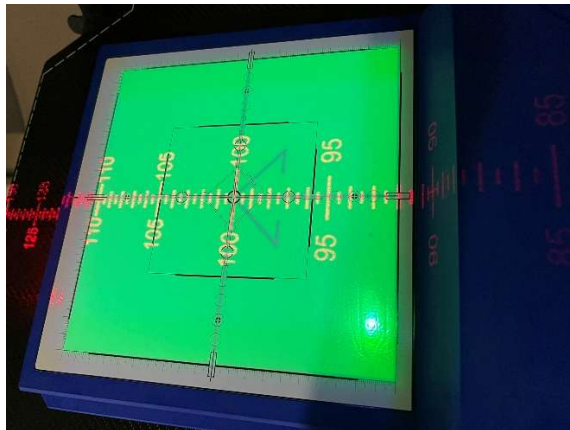
6 Routine Measurements

6.1 Standalone Mode

The fastest method of using the QABC Pro is to use Standalone mode. After baselines are saved within the application software, they are transferred to the device's internal memory along with other Settings information in preparation for use in Standalone mode. Standalone Mode provides users with quick Pass/Alert/Error results without the use of the QABC Pro software application or specific beam delivery routines. Coupled with battery power, users have no cables to contend with in Standalone Mode.

Setup

1. Place the QABC Pro device on the treatment couch. For best results, match the approximate time of day and couch positioning used when the baselines were taken to minimize variance caused by accelerator warm-up and changes in scatter contribution.
2. Align the desired light field size (10x10cm or 20x20cm) to the corresponding field lines on the top panel of the device, making sure the zone of irradiation is confined to the area above the indicated line.



3. Turn the unit on. After POST runs, the home screen will display along with the firmware version. Touch the forward '>' button to display the list of registered users. Scroll through the list ▲▼ and select the current user when the name appears in the center of the list. Tap on the name to select it.
4. The display will automatically switch to the list of registered linacs. Scroll until the name of the linac being tested appears in the center of the list, tap on the name to select it.
5. Once the User and Linac have been selected, the unit will go through a quick zeroing function and the display will show READY.
6. Exit the vault and use the patient camera aimed at the device touchscreen display to view and monitor device activity.



Ready State Shown on Device Touchscreen for Standalone Operation

Measurement

7. Prepare the linac for the first beam delivery.
8. Beam on at the linac console for the first measurement. During the exposure, the device display will state "ACQUIRING" and show a spinning tri-foil to indicate that radiation has been detected and measurement is in progress.

9. After the exposure has ended, the measurement is automatically matched to its baseline and the result displayed as follows:
 - **PASS** will be displayed if the measurement is below the alert threshold. Additional information will indicate energy detected and linac name.
 - **ALERT!**, flashes onscreen for 5 seconds, followed by **ALERT** with the metric(s) that surpass the alert threshold but are below the error threshold established at time of baseline acquisition. i.e. **ALERT – Axial Symmetry 3.8%**
 - **ALERT!**, flashes onscreen for 5 seconds, followed by **ERROR** with metric(s) that surpass the error threshold established at time of baseline acquisition. i.e. **ERROR – Axial Symmetry -5.6%**
10. Full measurement metrics are automatically saved to the device memory for download later.
11. The device re-zeroes to ready itself for next beam delivery. When **READY** displayed, deliver next energy.
12. Repeat steps 7-8 until measurements are completed for the day.
13. **Turn off** the device and **return it to the Power/Data Cradle** outside the treatment room.

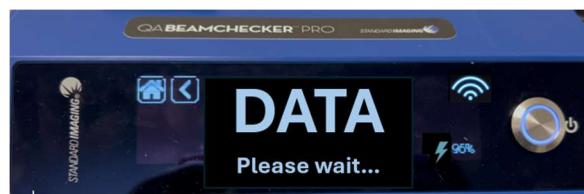
Data Transfer

Data transfer from the QABC Pro device to the database is automatic as long as the application server is running. Data transfers from the device to the database in one of three methods.

- a. Wi-Fi – Turn on the device and verify that it is connected to the network Wi-Fi (WLAN), typically in the bunker or the console area.



As soon as the application server detects that the device has data stored on it, the data will automatically start to transfer to the database.



When complete, the device display returns to the homepage and the data is ready for viewing in the Analysis tab within the browser software.

- b. Ethernet connection between the device and the local network (LAN) or network host computer where the application server and database are installed.

A direct connection between device and network host computer uses a Static network type and static IP addresses. Use the device touchscreen gear icon to access the device settings menu to: Select Network Type – Static, then review/edit the AppServer IP address and IP address to ensure that they are correct.

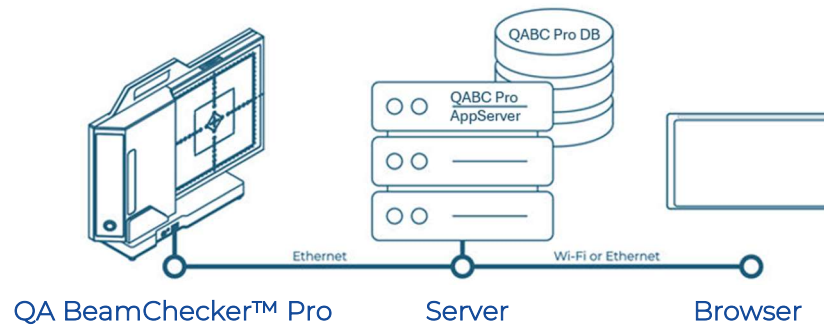


As soon as the application server detects that the device has data stored on it, the data will automatically start to transfer to the database.



When complete, the device display returns to the homepage and the data is ready for viewing in the Analysis tab within the software.

- c. Ethernet connection between the Power/Data Cradle and the local network (LAN). Placing the device on the Data/Power Cradle will automatically turn the device on.



As soon as the application server detects that the device has data stored on it, the data will automatically start to transfer to the database via the Data/Power cradle ethernet connection..

When complete, the device display returns to the homepage and the data is ready for viewing in the Analysis tab within the software.

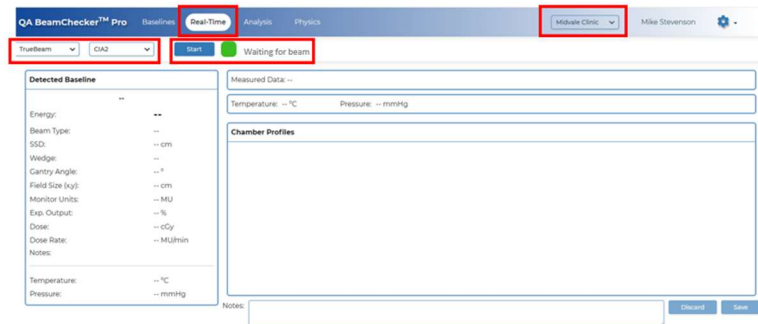
6.2 Real-Time Mode

Use Real-Time Mode to take measurements and view detailed results within the application software using either a Wi-Fi or ethernet connection between the device and computer. This method provides the user the opportunity to review measurement metrics against its baseline before either saving the data to the database or discarding it.

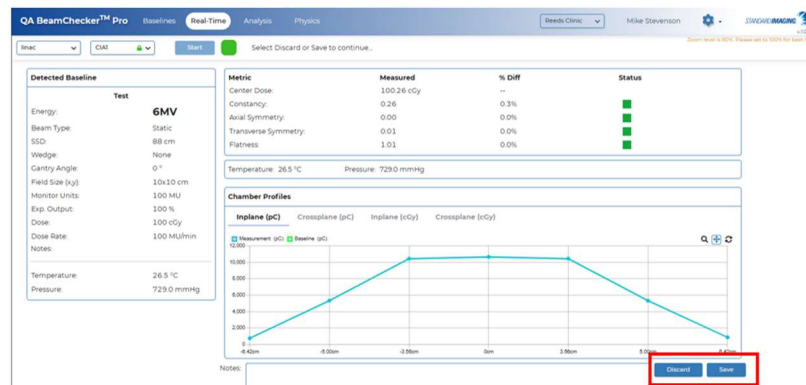
Real-Time Operation mode is particularly useful in these situations:

- Performing routine QA when comprehensive beam information is necessary at time of measurement
 - Times when automatic saving to the database is not desired.
1. Place the QABC Pro on the treatment couch at the appropriate SSD based on linac type.
 2. Align the device to either a 10 x 10 cm or 20 x 20 cm field size using the light field, room lasers and the device alignment lines.
 3. Connect the QA BeamChecker Pro to the PC using the provided ethernet cable. Alternatively, connect using the vault Wi-Fi access point.

4. Confirm communication configuration using the gear icon on the device display's homepage. Wi-Fi and ethernet to a hub use DHCP Mode. Direct ethernet connection between device and computer use Static Mode.
5. Using the Chrome browser, navigate to the QABC Pro software webpage.
6. Log in and select Clinic at the top of the menu bar.
7. Select the Real-Time tab
8. Select the Linac and Online device being used
9. Click Start once the green square and 'Waiting for beam' are displayed



10. Deliver the beam readied linac console. There is no specific beam delivery sequence required by QABC Pro for it to detect and match to its baseline and provide results compared to baseline due to the integrated build-up over the energy chambers and the unique automatic energy detection process.
11. Once results are displayed, the user selects either 'Save' to add the measurement to the database, or 'Discard' to reject the measurement. If a measurement is discarded, simply click the 'Start' button again and redeliver the beam.



7 Analysis and Reporting

There is a wealth of information available in the Analysis page of the application software. Data is presented separately for each Clinic, Linac, and Device combination selected for view.

PDF reports and .csv export files are generated in the Analysis page and saved to user-specified locations.

7.1 Viewing Data

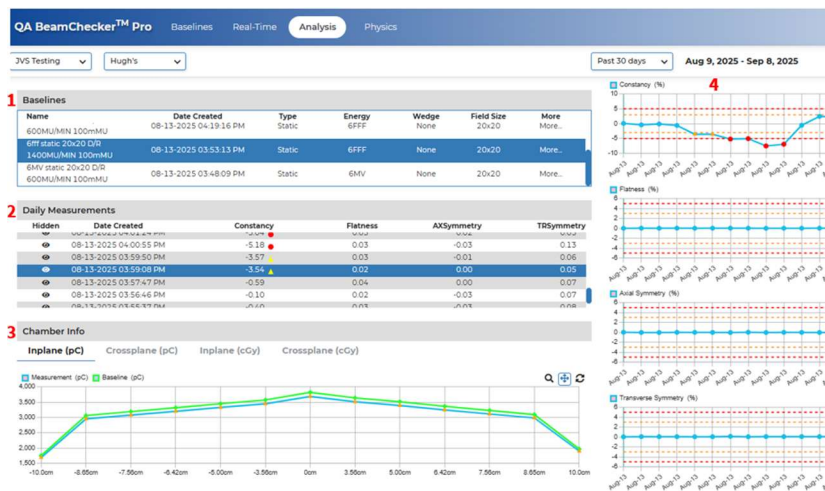
To access data, the user needs to first select the Clinic, Linac, and Device using the dropdown menu for each. Once those selections are made, the list of established baselines is displayed.



Click on a Baseline name to view all the measurements acquired against it.

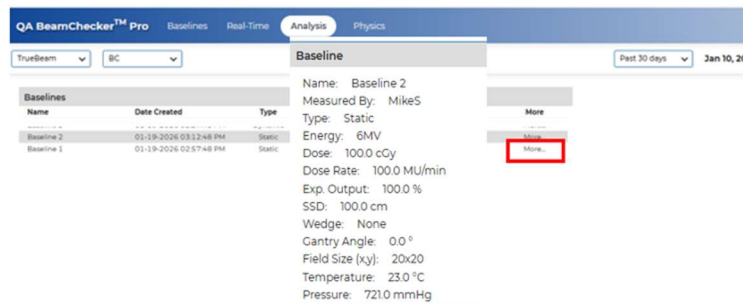
There are four distinct areas on the Analysis page, each further described below.

- 1) Baselines
- 2) Daily Measurements
- 3) Chamber Info
- 4) Trending for selected data range



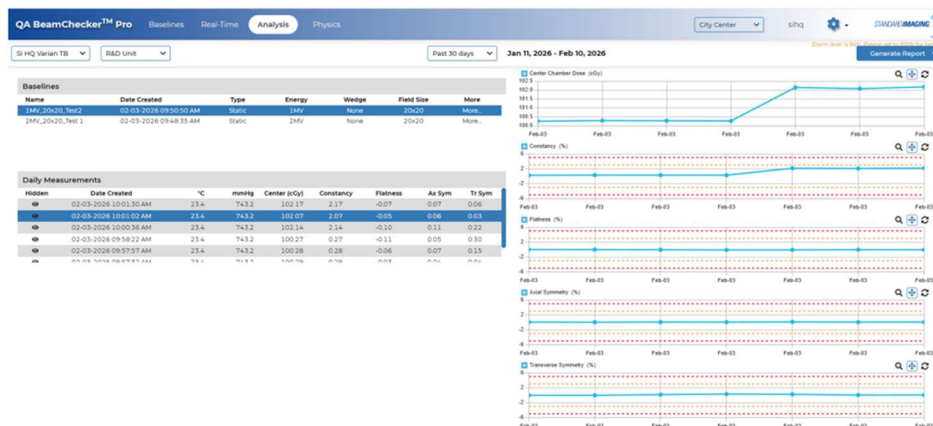
Baselines

Baselines are displayed in the order that they were established. Only a portion of the full baseline is visible on the Analysis page. In order to see the full baseline details of a particular baseline, hover over 'More' in the baseline row and the information will be displayed.



Daily Measurements

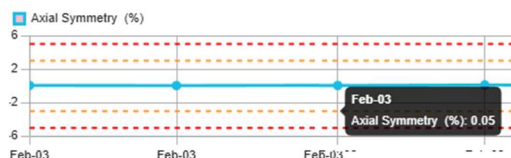
To view all measurements related to a specific baseline for the chosen Clinic, Linac, and Device combination, click on the baseline name and the Daily Measurements in tabular and graphical data is displayed.



The list of all measurements against the highlighted baseline are listed in timestamped order, with the most recent measurement listed first.

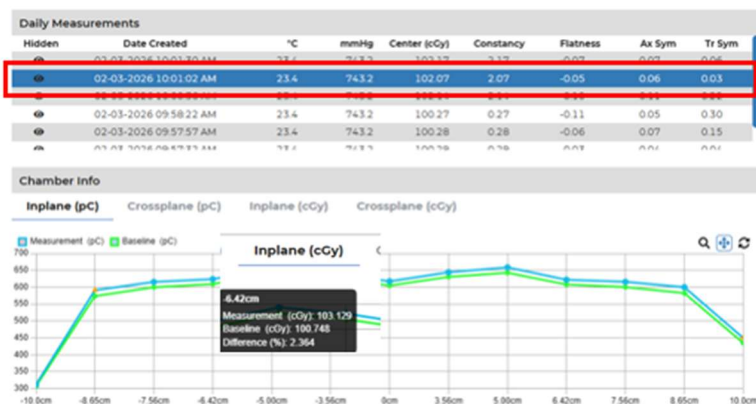
Measurement metrics displayed in the Daily Measurement table include temperature (°C), pressure (mmHg), Center (cGy), Constancy, Flatness, Axial Symmetry, and Transvers Symmetry.

Trended metrics include Center (cGy), Constancy, Flatness, Axial Symmetry, and Transvers Symmetry. Use the magnifying glass icon to zoom in on data points of interest. Hover over a data point to view measurement result.



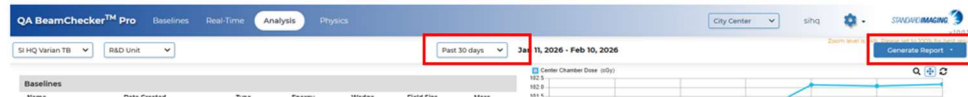
Chamber Information

To view the chamber profile information, highlight a measurement from the Daily Measurement Table. Toggle between the Inplane (pC), Crossplane (pC), Inplane (cGy), Crossplane (cGy) to view each profile against its baseline. Use the magnifying glass icon to zoom in on data points of interest. Hover a datapoint to view the measurement result.



7.2 Reports

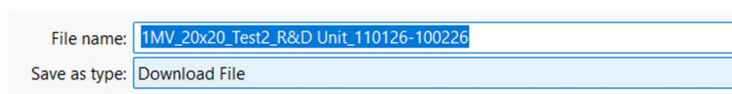
To generate either a PDF report of a .csv export file, Click on the 'Generate Report' button at the top right of the Analysis page after having chosen the date range to be reported.



Select either CSV or PDF



Click on CSV to automatically generate the export file with a default file name using the baseline name and date range. The file name can be edited before saving the file to a user-specified location.



Click on PDF a popup to add Optional Report Information will appear. Enter comments if desired, then click 'Generate PDF', the default file name for the report is generated using the baseline name and date range.. The file name can be edited before saving the PDF report to a user-specified location.

8 Physics Mode

The Physics Mode allows use of the QA BeamChecker Pro for measurement and experimentation and possible troubleshooting. . Because data collected is not associated with baselines or saved to the database, this mode is ideal for experimental or customized measurements. For this mode, the QABC Pro device must be connected to the PC using a Wi-Fi access point in the bunker or ethernet cable. Unlike other measurement modes, the Physics Mode requires manual start and stop of the measurement.

1. Place the QABC Pro on the treatment couch at the appropriate SSD based on linac type.
2. Align the device to either a 10 x 10 cm or 20 x 20 cm field size using the light field, room lasers and the device alignment lines.
3. Connect the QA BeamChecker Pro to the PC using the provided ethernet cable. Alternatively, connect using the vault Wi-Fi access point.
4. Confirm communication configuration using the gear icon on the device display's homepage. Wi-Fi and ethernet to a hub use DHCP Mode. Direct ethernet connection between device and computer use Static Mode.
5. Using the Chrome browser, navigate to the QABC Pro software webpage.

- Log in and select Clinic at the top of the menu bar.
- Select the Physics Tab, choose the Linac and the online Device being used for testing from the pulldown menus in the upper left.
- Enter the test parameters to match the intended beam delivery, all fields are completed the 'Start' button becomes active.

QA BeamChecker™ Pro

Baselines Real-Time Analysis **Physics**

N2 Allegheny Beta **Start** Device Ready

Test Name: 6 MV_Test
 Beam Type: Static
 Energy: 6 MV
 SSD: 100 cm
 Wedge: None
 Gantry Angle: 0°
 Field Size: 20 x 20
 Monitor Units: 100 MU
 Expected Output: 100 %
 Dose*: 100 cGy
 Dose Rate: 600 MU/min
 Notes:

Elapsed Time: --:-- ms

Physics Measurements	
Date:	--
Axial Symmetry:	--%
Transverse Symmetry:	--%
Flatness:	--%
Internal Temperature:	--
Ambient Pressure:	--
Battery:	--

- Press 'Start' which starts the counter in the 'Elapsed Time' field and will switch and activates the 'Stop' button.

QA BeamChecker™ Pro

Baselines Real-Time Analysis **Physics**

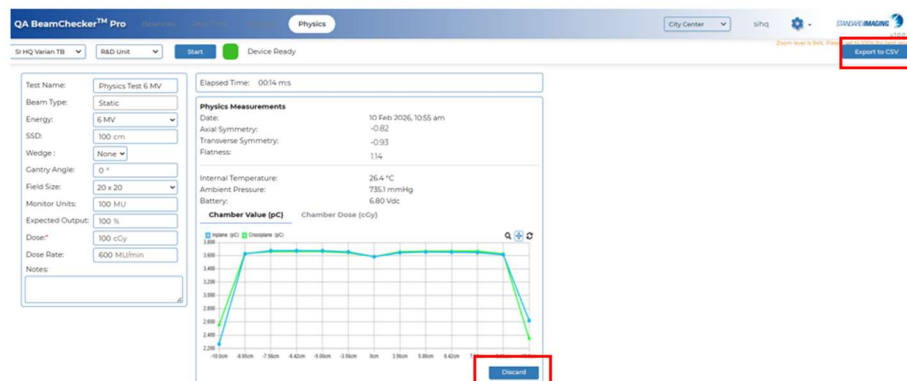
SI HQ Varian TB R&D Unit **Stop** Acquiring...

Test Name: Physics Test 6 MV
 Beam Type: Static
 Energy: 6 MV
 SSD: 100 cm
 Wedge: None
 Gantry Angle: 0°
 Field Size: 20 x 20
 Monitor Units: 100 MU
 Expected Output: 100 %
 Dose*: 100 cGy
 Dose Rate: 600 MU/min
 Notes:

Elapsed Time: 00:07 ms

Physics Measurements	
Date:	--
Axial Symmetry:	--%
Transverse Symmetry:	--%
Flatness:	--%
Internal Temperature:	--
Ambient Pressure:	--
Battery:	--

- Deliver the beam then click 'Stop' to end the collection.
- The measurement specifics are displayed including timestamped date, axial symmetry, transverse symmetry, and flatness. Inplane and crossplane measured chamber values are plotted, viewable in both pC and cGy. Internal temperature, ambient pressure, and battery information are also displayed.



12. Measured results onscreen are not saved to the database. However, results can be saved to a CSV by clicking on the 'Export to CSV' button in the upper Right. Save the CSV report in a user-specified location.
13. If results are not wanted the 'Discard' button can be pressed, and the measurement will be discarded and the displayed data cleared.
14. After the data is cleared, the 'Start' button is reactivated to begin another acquisition.

9 Definition of Algorithms

9.1 Temperature and Pressure Correction

The ion chamber measured values are corrected for ambient temperature and pressure at the time of measurement using the following equation:

$$Measurement_{Corrected} = Measurement_{Raw} \times \left(\frac{273.15 + T(^{\circ}C)}{295.15} \times \frac{760}{P(mmHg)} \right)$$

Where:

T (°C) = The temperature in °Celsius at the ion chamber location

P(mmHg) = The pressure in mmHg within the device measured by the on-board sensor

9.2 Dose Conversion

To convert measured charge to dose for the purposes of display, the user enters a **nominal dose** for the center chamber as a parameter for baseline creation. This dose is used along with the baseline's center-chamber value in pC to create a unit conversion.

$$Dose\ Conversion\ Factor\ (cGy/pC) = \frac{Nominal\ Dose\ (cGy)}{Baseline_{Center\ Chamber}\ (pC)}$$

9.3 Baseline Matching

QA measurements are matched to the appropriate baseline using several factors including field size, beam modality, beam energy metric, and measurement duration.

9.4 Constancy

Constancy is a measure of the percentage difference of the center of the field between the QA measurement and the baseline.

$$Constancy = 100 * \frac{Center_{Measurement} - Center_{Baseline}}{Center_{Baseline}}$$

9.5 Flatness

Flatness is a measure of how curved or peaked the beam profile is.

$$Flatness = \frac{Max - Min}{Max + Min}$$

Where:

Max = The maximum measurement value found among all the chambers located inside 80% of the field width.

Min = The minimum measurement value found among all the chambers located inside 80% of the field width.

9.6 Axial and Transverse Symmetry

The two chambers used in this metric are the ones just inside 80% of the field width along their respective axis.

$$\text{Axial Symmetry} = \frac{\text{Top} - \text{Bottom}}{\text{Bottom}}$$

$$\text{Transverse Symmetry} = \frac{\text{Right} - \text{Left}}{\text{Left}}$$

For the 10x10 field, the equations above are used as written.

For the 20x20 field, the symmetry metric for the 10x10 and 20x20 fields are both calculated. The reported value is the larger of the two calculations.

10 Troubleshooting / Frequently Asked Questions

Refer to the following scenarios if experiencing Problems with the QA BeamChecker Pro. Before contacting Standard Imaging, read this section to potentially resolve an issue without sending the device in for service.

10.1 Power on Self-Test (POST) Failures

If any of the internal tests fail on device startup or prior to measurement acquisition, the device will have to be shut down, then restarted to run through the POST again. If it still fails, contact Standard Imaging Customer Care team at support@standardimaging.com.

POST fail conditions listed in order of internal test sequence:

1. FRAM Header Error: This error is shown when the checksum calculated against the FRAM header does not match the stored FRAM checksum. In order for this fail, both the FRAM and it's backup (the mirror) need to fail
2. Users/Machines/Wi-Fi Access Points/Baselines/Measurements Corrupted error: Each of these have their own error screen, however they all run the same test just on different spots of memory. If the sentinel value does is not found at the expected spot in memory, these tests will fail as it means that something is either out of sync or corrupted.
3. Pressure error: This error is shown when the pressure measured by the temperature pressure sensor on the main board is not within the acceptable range of 500.0mmHg - 825.0mmHg
4. Battery level error: This error is shown when the device is both not plugged in, and the battery voltage is measured below 6.2V (10%). If this error is displayed, then a power cycle of the device is required. Even if the device is plugged back in, it still requires

power cycle of the device. The POST should pass with the device plugged in and when turned back on.

5. RTD value error: This error is shown when any one of the temperatures measured at the RTD sensors located at each end of the chamber board fall outside the acceptable range of 15.0C - 40.0C
6. RTC Battery level error: This error is shown when the battery level of the RTC (Real Time Clock), which has its own separate battery from the primary one, is below 2000mV (2V)
7. RTC error: This error is shown when the RTC is not retrieving time as expected. We first use the RTC to get the time, wait 1 second, then get the time again. If the times retrieved are the same then this test fails, if they are different at all the test will pass.
8. Bias Voltage error: This error is shown when the measured bias voltage falls outside the acceptable range of 290.0V - 310.0V

10.2 Electromagnetic or Other Interference

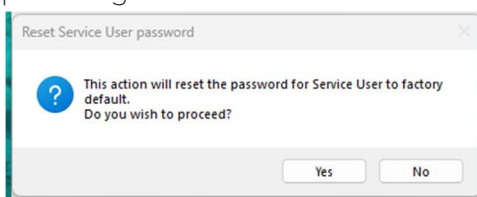
If the QABC Pro causes or is affected by interference with other equipment, try to correct the interference by performing the following:

- Increase separation between equipment.
- Connect the power supply power cord into a different grounded AC outlet or into a circuit controlled by a different circuit breaker.
- Consult Standard Imaging, Inc.

10.3 Service User Password Reset

If the Service User password is lost or forgotten, it can be reset via the desktop QABC Pro Admin Utility.

6. Right click on the QABC Pro Admin Utility icon and select “run as administrator”
7. Select “Yes” on the pop-up message that appears
8. Click on the Database menu and select “Service User Reset”
9. Select “Yes” on the pop-up message.

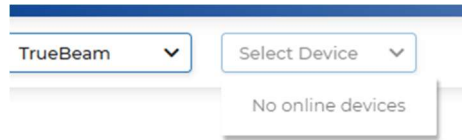


10. In your browser, navigate to the QABC Pro Application server URL and login as Service using factory setting password “3120”. Change the password as instructed in order to complete login.

Note that the Service user is only used in the Settings menu to add/edit Organization, Clinic and Users in the absence of a user with Physicist Administrator rights.

10.4 No Online Devices Found

When making your clinic, linac and device selections in order to take measurements in Baselines, Real-Time or Physics mode and the Device dropdown states ‘No online devices, verify the following:



1. Confirm your communication connection on the device display, the Wi-Fi or ethernet symbol should be at the top right of the touchscreen device display. If  is displayed, then the device is not connected to the network (LAN) or network PC.
2. If the device displays has either connection symbol  or  then use the touchscreen display to check the network type.
 - a. If Dynamic (DHCP) then check the AppServer IP address since this may have changed since last use. To update the AppServer IP Address, tap on a number that needs to be updated, then use the up and down arrows to increase or decrease that digit. Continue until all digits of the IP address are updated. Then return to the homepage.
 - b. If Static, then check, Net Mask, Gateway and IP Address are set according to local IT setup. Update as needed using the device touchscreen display. Then return to the homepage.
3. Alternatively, use Command Prompt to ping the device IP address,

```
C:\Users\azens>ping 172.16.44.155
```

If the device fails to reply, use Command Prompt to check the AppServer IP address and update as needed on the device touchscreen display.

```
Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix  . : standardimaging.com
IPv6 Address. . . . . : fe80:6c44:767f:7130:1a35
IPv6 Address. . . . . : fe80:6c42:4fcb:6a90:1a35
Link-local IPv6 Address . . . . . : fe80::6c42:4fcb:6a90:1a35
IPv4 Address. . . . . : 172.16.44.37
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : 172.16.10.1
```

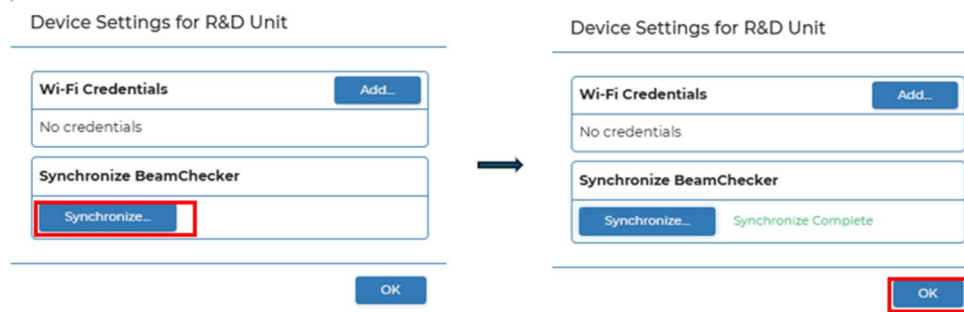
Return to the device homepage.

10.5 Device Not Synchronized

The QABC Pro Application Server is the maintainer of information about Settings items such as machines, users, baselines, etc. This means that the QABC Pro device has to be synchronized to the user's local copy of that information whenever its connected to the Application Server (**online**). Normally, the QABC Pro Application Server knows when a device needs to be updated in normal use so it maintains that synchronization automatically. However, if the device has been returned to Standard Imaging for service, it will no longer be properly synchronized to the user's local QABC Pro Application Server. In this instance, the user has to manually Synchronize the device.

1. To do so, connect the device to PC via ethernet or Wi-Fi access point.
2. Login to the software and select a Clinic in the top menu bar
3. Then go to Settings > Devices to verify the communication connection by confirming the device is shown as **online**.
4. Click on the gear icon for the selected online device to synchronize it to the local QABC Pro Application Server.

- Click 'OK' when it shows 'Synchronize Complete'.



11 Electromagnetic Compatibility

11.1 Electromagnetic Emissions

Guidance and Manufacturer's Declaration - Electromagnetic Emissions.

The QA BeamChecker Pro is intended for use in the electromagnetic environment specified below. The customers or the users should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic environment - guidance
RF radiated emissions CISPR 11	Class A, Group 1	RF emissions are low and are not likely to cause any interference in nearby electronic equipment
RF conducted emissions CISPR 11	Class A, Group 1	
Harmonic distortion IEC 61000-3-2	Class A, < 16A	The QA BeamChecker Pro is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage supply network that supply buildings used for domestic purposes.
Voltage fluctuations/flicker emissions IEC 61000-3-3	All parameters, <16A	

11.2 Electromagnetic Immunity

Guidance and Manufacturer's Declaration - Electromagnetic Immunity.

The presence of electromagnetic disturbances may degrade the device's Essential Performance by causing fluctuations in the current and charge readings.

The QA BeamChecker Pro is intended for use in the electromagnetic environment specified below. The customers or the users should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance test	Electromagnetic environment - guidance
Electrostatic discharge (ESD)	±8 kV contact	±8 kV contact +/-2kV, +/-4kV, +/-8kV, ±15 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material,

IEC 61000-4-2	+/-2kV, +/-4kV, +/-8kV, ±15 kV air		the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-4	±1 kV line(s) to lines ±2 kV line(s)	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% U _T ; 0.5 cycle at -0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° 0%U _T ; 1 cycle 70%U _T ; 25/30 cycles 0° 0%U _T ; 250/300 cycles	% U _T ; 0.5 cycle at -0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° 0%U _T ; 1 cycle 70%U _T ; 25/30 cycles 0° 0%U _T ; 250/300 cycles	Mains power quality should be that of a typical commercial or hospital environment. If the User of the QA BeamChecker Pro requires continued operation during power mains interruptions, it is recommended that the QA BeamChecker Pro is powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical commercial or hospital environment.
Surge Immunity IEC 61000-4-5	±0.5kV, ±1kV Line-to-Line ±0.5kV, ±1kV, ±2kV Line-to-Ground	±0.5kV, ±1kV Line-to-Line ±0.5kV, ±1kV, ±2kV Line-to-Ground	Mains power quality should be that of a typical commercial or hospital environment.
Immunity test	IEC 60601 test level	Compliance test	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	6V in ISM bands between 80% Am at 1 kHz 3V 150 kHz to 80 MHz	6V 3V	Portable and mobile RF communications equipment should be used no closer to any part of the QA BeamChecker Pro, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

			Recommended separation distance: $d=1.2 \sqrt{P}$ 150 kHz to 80 MHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 80% AM at 1 kHz Section 8.10	3 V/m Section 8.1	$d=0.35 \sqrt{P}$ 80 MHz to 800 MHz $d=0.7 \sqrt{P}$ 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b Interference may occur in the vicinity of equipment marked with the following symbol:
Proximity Magnetic Fields IEC 60601-1-2, 8.1 / IEC 61000-4-39.2017	9kHz to 13.56 MHz		
NOTE 1: UT is the a.c. mains voltage prior to application of the test level. NOTE 2: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 3: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which QA BeamChecker Pro used exceeds the applicable RF compliance level above, the QA BeamChecker Pro should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the device. b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

11.3 Recommended separation distances

Recommended Separation between Portable and Mobile RF Communications Equipment and the QA BeamChecker Pro.

The QA BeamChecker Pro is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the QA BeamChecker Pro can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the QA BeamChecker Pro as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)		Separation distance according to frequency of transmitter (m)		
		150 kHz to 80 MHz $d=1.2 \sqrt{P}$	80 MHz to 800 MHz $d=0.35 \sqrt{P}$	800 MHz to 2.5 GHz $d=0.7 \sqrt{P}$
QA BeamChecker Pro	0.01	0.12	0.12	0.23
	0.1	0.38	0.38	0.73
	1	1.2	1.2	2.3
	10	3.8	3.8	7.3
	100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.				

Proper maintenance of the electrometer may be required to ensure continued safe operation in the presence of electromagnetic disturbances.

WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and other equipment should be observed to verify they are operating normally.

The QA BeamChecker Pro EMC compliance was evaluated using anticipated worst case detector cable lengths. Thus, other detectors can be used.

WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the QA BeamChecker Pro, including cables specified by the manufacturer. Otherwise, degradation of performance of this equipment could result.

NOTE: The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class

B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

12 Maintenance

Exterior cleaning of the device can be done with a soft brush and a cloth. Gently brush all surfaces to remove dirt and dust. Remove any remaining dirt with a cloth slightly dampened with a solution of mild detergent and water or a liquid disinfecting agent. Do not permit any liquid to seep into the QA BeamChecker Pro in any manner during cleaning. It is not recommended to clean the window of the OLED display with anything other than a mild detergent and a very soft cloth. Failure to use a soft cloth may result in a scratched display, and this may impair the visibility of the OLED.

There are no user serviceable parts in the QA BeamChecker Pro.

Sterilization of the QA BeamChecker Pro is not required.



If assistance is desired in the proper disposal or recycling of this product (including accessories and components), after its useful life, please return to Standard Imaging.

13 Parts and Accessories

REF Description

90503 QA BeamChecker Pro

81026 User Manual

81027 Manual, Multilingual Quick Reference Guide

74905 Gantry Mount Accessory (varies by linac model)

74096 Additional Vault Package Power/Data Cradle

50424 QA BeamChecker Pro Software

20445 Adapter, USB to RJ45 (Ethernet)

20474 Universal Input Power Supply, 9 Volt DC, 2.0 A, 60601-1 compliant

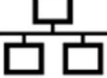
20177 Power Cord, AC, USA

NOTE: The Universal Input Power Supply is used with a region-specific power cord. Please specify for regions outside of the USA.

14 Description of Symbols

The following symbols are found on the QA BeamChecker Pro:

	Attention, consult accompanying documents
	Dangerous voltage present inside enclosure
	Consult user's guide before use

	Power on
	Device diagnostics
	Homepage
	Standalone Mode operation
	Menu scroll Increase/decrease a number
	Wi-Fi connectivity
	Ethernet port and Ethernet connectivity
	No connectivity between device and software
	Battery level
	Charging battery
	9VDC @ 2.0A power supply input. Center positive. Use only with specified power supply.
	Shipping and storage temperature limits
	Shipping and storage humidity limits
	Shipping and storage pressure limits
	The device meets the essential requirements of Council Directive 93/42/EEC concerning medical devices
	Manufacturer. This symbol is accompanied by the name and address of the manufacturer
	Manufacturing date. This symbol is accompanied by a date to indicate the date of manufacture.

	Device part number
	Serial number. This symbol is accompanied by the manufacturer's serial number adjacent to it.
	Medical device
	Separate collection of electrical and electronic devices in accordance with EC Directive 2002/96/EC: Do not dispose of the device with normal domestic waste. Keep separate from domestic waste and dispose in an environmentally safe way in compliance with local regulations.
	Environmentally-friendly product which can be recycled and revised

15 QA BeamChecker Pro Specifications and System Requirements

15.1 Device Specifications

Detectors	29 vented, fully guarded, ionization chambers: • 1 center detector • 16 quadrant detectors (7.0 mm Ø) • 4 energy identification chambers (7.0 mm Ø) • 8 linear detectors (3.1 mm x 12.4 mm)
Chamber Volume:	0.077 cc
Parallel Plate Separation:	2.0 mm
Collection Electrode:	0.7cm diameter
	1 diode for electronics dose monitoring.
Inherent Buildup:	1.3 cm water-equivalent material
Light Field Alignment:	10 cm x 10 cm alignment grid and 20 cm x 20 cm alignment grid
Radiation Measured:	
Photons:	⁶⁰ Co to 25 MV
Electrons:	4 MeV to 25 MeV
Real-time Clock:	On board, for data validation and storage. Provides time and date stamp to all data
QABC PRO Memory Capacity:	Stores up to 650 measurements (maximum 26,650 data points) before transfer required
Temperature/pressure measurement:	Precision sensors on board, automatic compensation • 1 Piezo-resistive digital pressure sensor • 4 Platinum RTD (resistance temperature detector) sensing elements
Pressure Resolution:	0.1 mmHg

Temperature Resolution:	0.1°C
Dose Rate	Minimum: 50 MU/minute, Maximum: 2400 MU/minute
Operating Parameters: Temperature: Relative Humidity: Pressure:	15 to 35 °C 20 to 80% non-condensing 600 to 800 mmHg
Storage Parameters: Temperature: Relative Humidity: Pressure:	-15 to 50 °C 10 to 95% non-condensing 550 to 850 mmHg
Display Display Color:	5.5-inch OLED capacitive touch screen, 256x64 Dot Matrix White
Audio:	On board speaker for audio feedback on start-up, button presses, operator alerts, etc.
Dimensions (QA BeamChecker Pro): Width: Height: Length:	30.5 cm (12.0 in) 6.0 cm (2.36 in) 42.5 cm (16.74 in)
Dimensions (Power/Data Cradle): Width: Height: Length:	10.2 cm (4.00 in) 8.3 cm (3.26in) 29.2 cm (11.50 in)
Weight: QA BeamChecker Pro: Power/Data Cradle:	5.7 kg (12.6 lbs) 1.6 kg (3.6 lbs)
Power Requirements: Battery: Battery Operation Time: Charge Time: Charger Input: Approved Power Supply:	Rechargeable LiFePO4 (Lithium Iron Phosphate) Approximately 8 hours of continuous use Approximately 20 hours from full discharge 90 – 240 VAC, 50-60 Hz, EN/IEC 60601-1 GlobTek®, Inc. model GTM96180-1811-2.0-T3 NOTE: The use of any other power supply and using alternates other than the UL/CSA recognized power cord can degrade minimum safety. The proper replacements from Standard Imaging, Inc. are required for compliance with the requirements of IEC 60601-1.
Product Standards:	IEC 60601-1-2 Edition 4.1:2020 IEC 60601-1-6:2010/AMD2:2020, IEC 60601-1:2005/AMD2:2020 ¹ 1 Externally Certified

* Patent Pending

15.2 System Requirements

Server Host

Operating System (recommended)	Windows Server 2025 (or later), 64-bit, Virtual machine is acceptable
Operating System (minimum)	Windows Server 2022 (or later), 64-bit, or Windows 11, Professional, 64-bit, English version only, stationary computer only Virtual machine is acceptable
Processor	Dual Core, 1.4 GHz minimum; Quad Core, 2 GHz recommended
Memory	32 GB RAM minimum, 64 GB RAM recommended (more is better)
Hard Drive	64 GB or greater, 2 GB free space for initial software installation 32 GB or 25% free space, whichever is larger, recommended
Screen Resolution	1024 x 768 or greater, 24-bit TrueColor or greater 1920 x 1080 if the server is used to display the client UI
Connectivity	IPv4 LAN, 100 Mbit/s or greater IPv6 optionally disabled HTTP and HTTPS No other application may use port 80 or 443 on the server hosting QABCP-AS.
Firewall	Outbound: Standard default configuration Inbound: TCP Ports 80 and 443

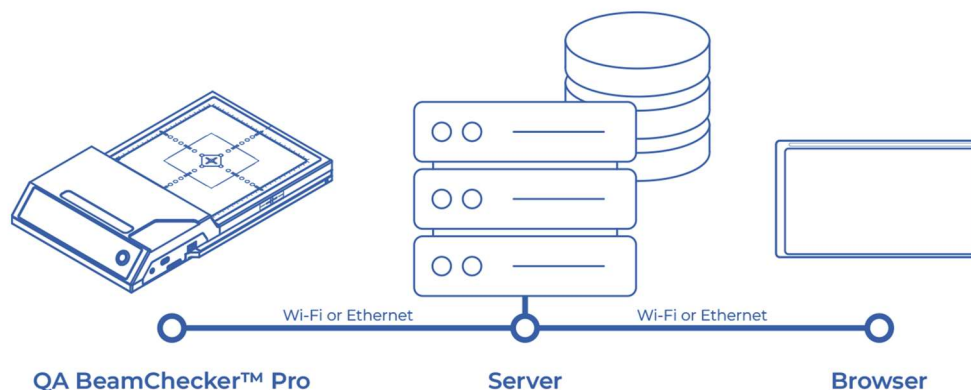
Client Host

Operating System	N/A
Processor	N/A
Memory	16 GB RAM Recommended (more is better)
Screen Resolution	1920 x 1080 or greater, 24-bit TrueColor or greater
Connectivity Protocol	IPv4 LAN, TCP, 100 Mbit/s or greater
Connectivity Ports	IPv4 ports 80 and 443, IANA 'system ports' for HTTP and HTTPS
Client Platform	Google Chrome™ browser, current version

Device Hardware

Connectivity Physical (cable)	10BaseT or 100BaseTX Ethernet cabled infrastructure. Static or DHCP
-------------------------------	---

Connectivity Physical (Wi-Fi)	802.11b/g/n 2.4Ghz Wi-Fi. DHCP only
Connectivity Protocol	IPv4 LAN, TCP
Connectivity Port	IPv4 Port 30319



Network Configuration

15.3 Wi-Fi Connectivity

The QABC Pro device implements Wi-Fi using the IEEE 802.11b/g/n standards working in the 2.4 GHz band.

Using these three standards provides facility flexibility with up to 150 Mbps when operating using the 802.11n standard.

The QABC Pro device can connect to closed Wireless LANs using the "Wi-Fi Protected Access 2 - Pre-Shared Key (WPA2-PSK)".

The device does not support:

- "Wired Equivalent Privacy (WEP)", an old WLAN security protocol,
- "Wi-Fi Protected Access (WPA)", the forerunner of WPA2.
- "Wi-Fi Protected Access 3 (WPA3)" because the design of the Wi-Fi implementing integrated circuit predates the promulgation of the WPA3 standard in 2018.

15.4 Software-Firmware Compatibility Matrix

Software version: 3.1.0.5	Firmware version(s): 1.0.0.9
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16 WARRANTY STATEMENT- 4424-18

Standard Imaging, Inc. sells this Product under the warranty herein set forth. The warranty is extended only to the buyer purchasing the Product directly from Standard Imaging, Inc. or as a new Product from an authorized dealer or distributor of Standard Imaging, Inc.

For a period Provided in the table below from the date of original delivery to the purchaser or a distributor, this Standard Imaging, Inc. Product, Provided in the table, is warranted against

functional defects in design, materials and workmanship, Provided it is Properly operated under conditions of normal use, and that repairs and replacements are made in accordance herewith. The foregoing warranty shall not apply to normal wear and tear, or if the Product has been altered, disassembled or repaired other than by Standard Imaging, Inc. or if the Product has been subject to abuse, misuse, off-label use, negligence or accident.

Product	Warranty Period
Standard Imaging Ionization Chambers	5 years
Standard Imaging Detectors	1 year
Standard Imaging Well Chambers	2 years
Standard Imaging Electrometers	5 years
Standard Imaging BeamChecker Products	2 years
TomoScanner and TomoElectrometer	2 years
Standard Imaging Software Products	1 year
All Other Standard Imaging Products	1 year
Standard Imaging Custom Products	1 year
Standard Imaging Remanufactured Products	180 days
Standard Imaging Custom Select Products	90 days
Consumables	90 days
Serviced Product	90 days (for service performed)
Resale Products	As defined by the Original Equipment Manufacturer
ADCL Product Calibration (Standard Imaging uses the UW-ADCL for recalibrations required under warranty, unless otherwise requested)	0 - 90 days = 100% of ADCL Calibration Costs 91 - 182 days = 75% of ADCL Calibration Costs 183 - 365 days = 50% of ADCL Calibration Costs 366 - 639 days = 25% of ADCL Calibration Costs (days from date of shipment to customer)

Standard Imaging's sole and exclusive obligation and the purchaser's sole and exclusive remedy under the above warranties are, at Standard Imaging's option, limited to repairing, replacing free of charge or revising labeling and manual content on, a Product: (1) which contains a defect covered by the above warranties; (2) which are reported to Standard Imaging, Inc. not later than seven (7) days after the expiration date of the warranty period in the table; (3) which are returned to Standard Imaging, Inc. Promptly after discovery of the defect; and (4) which are found to be defective upon examination by Standard Imaging Inc. All transportation charges (including customs, tariffs, duties and brokerage fees) are the buyer's responsibility. This warranty extends to every part of the Product excluding consumables (fuses, batteries, or glass breakage) or material reactions. Standard Imaging, Inc. shall not be otherwise liable for any damages, including but not limited to, incidental damages, consequential damages, or special damages. Repaired or replaced Products are warranted for the balance of the original warranty period, or at least 90 days.

This warranty is in lieu of all other warranties, express or implied, whether statutory or otherwise, including any implied warranty of fitness for a particular purpose. In no event shall Standard Imaging, Inc. be liable for any incidental or consequential damages resulting from

the use, misuse or abuse of the Product or caused by any defect, failure, malfunction or material reactions of the Product, whether a claim of such damages is based upon the warranty, contract, negligence, or otherwise.

This warranty represents the current standard warranty of Standard Imaging, Inc. Please refer to the labeling or instruction manual of your Standard Imaging, Inc. Product or the Standard Imaging, Inc. web page for any warranty conditions unique to the Product.

17 Serialization Information

Standard Imaging Products that are serialized contain coded logic in the serial number which indicates the Product, day and year of manufacture, and a sequential unit number for identification:

A YY DDD X

A Unique Product ID

YY Last two digits of the year
(e.g. 1999 = 99, 2000 = 00)

DDD Day of the year ($1 \leq DDD \leq 365$)

X Unique unit ID number ($0 \leq X \leq 9$)



18 Customer Care Policy Statement

Standard Imaging, at its discretion, may extend customer support only to the buyer purchasing the Product directly from Standard Imaging, Inc. or as a new Product from an authorized dealer or distributor of Standard Imaging, Inc. This customer care statement is in lieu of all other customer support statements, express or implied, whether statutory or otherwise, including any implied statements of fitness for a particular purpose.

Standard Imaging:

- Technical support is preferentially biased to those customers with valid and applicable Standard Imaging Certificate of Maintenance agreements.
- Technical support may range from providing detailed solutions to upgrade recommendations to the latest version of software for discontinued Products.
- Will, at a minimum, provide technical support during its normal hours of operation.
- May, at its discretion, limit support of ancillary systems beyond its direct control, such as information technology systems, database management and 3rd party Programs.
- Will provide technical support for the Product for a minimum of 7 years from the date of delivery or discontinuance.
- Will not provide technical support for obsolete products, those products which are 7 years past the date of discontinuance.
- Will provide technical support for any and all involving issues with significant product risk, regardless of product age.

This customer care statement represents the current standard customer care statement of Standard Imaging, Inc. Please refer to the labeling or instruction manual of your Standard Imaging, Inc. Product or the Standard Imaging, Inc. web page for any customer care statement conditions unique to the Product. Specifications subject to change without notice.

19 Customer Responsibility

This product and its components will perform properly and reliably only when operated and maintained in accordance with the instructions contained in this manual and accompanying labels. A defective device should not be used. Parts which may be broken or missing or are clearly worn, distorted or contaminated should be replaced immediately with genuine replacement parts manufactured by or made available from Standard Imaging Inc.

⚠ CAUTION: Federal law in the U.S.A. and Canadian law restrict the sale, distribution, or use of this Product to, by, or on the order of a licensed medical practitioner. The use of this Product should be restricted to the supervision of a qualified medical physicist.

⚠ CAUTION: As desired by IAEA, English is the default language for labeling and manuals. If translated versions are available, resolve any differences in favor of the English versions.

⚠ WARNING: Measurement of high activity radioactive sources is potentially hazardous and should be performed by qualified personnel.

⚠ WARNING: Proper use of this device depends on careful reading of all instructions and labels.

⚠ WARNING: Where applicable, Standard Imaging Products are designed to be used with the versions of common radiation delivery devices, treatment planning systems and other products or systems used in the delivery of ionizing radiation, available at the time the Standard Imaging product is released. Standard Imaging does not assume responsibility, liability and/or warrant against, problems with the use, reliability, safety or effectiveness that arise due to the evolution, updates or changes to these products or systems in the future. It is the responsibility of the customer or user to determine if the Standard Imaging product can be properly used with these products or systems.

Should repair or replacement of this product become necessary after the warranty period, the customer should seek advice from Standard Imaging Inc. prior to such repair or replacement. If this product is in need of repair, it should not be used until all repairs have been made and the product is functioning properly and ready for use. After repair, the product may need to be calibrated. The owner of this product has sole responsibility for any malfunction resulting from abuse, improper use or maintenance, or repair by anyone other than Standard Imaging Inc.

Standard Imaging will make numerous and reasonable attempts to contact a customer following completed manufacture or service of a product. Should a customer product remain at Standard Imaging for more than 1 year following its completed manufacture or service, Standard Imaging reserves the right to resell, restock, donate, discard or destroy the product.

If, in relation to the use of this product, a death or a serious deterioration of health has occurred, this should be reported to Standard Imaging, Inc. and the National Competent Authority of the country in which the incident occurred. When in doubt, please consult with an advisor or reach out to Standard Imaging, Inc. for further assistance.

The information in this manual is subject to change without notice. Please see www.standardimaging.com for the latest information. No part of this manual may be copied or reproduced in any form or by any means without prior written consent of Standard Imaging Inc.

20 Service Policy

If service, including recalibration, is required, please contact Standard Imaging's Customer Service department by phone or email prior to shipping the product. Standard Imaging's Customer Service and Technical Service staff will attempt to address the product issue via phone or email. If unable to address the issue, a return material authorization (RMA) number will be issued. With the RMA number, the product can be returned to Standard Imaging. It is the responsibility of the customer to properly package, insure and ship the product, with the RMA number clearly identified on the outside of the package. The customer must immediately file a claim with their carrier for any shipping damage or lost shipments. Return shipping and insurance is to be pre-paid or billed to the customer, and the customer may request a specific shipper. Items found to be out of warranty are subject to a minimum service fee of 1 hour labor (excluding recalibrations) for diagnostic efforts and require a purchase order (PO) before service is performed. With concurrence from customer, the product may be replaced if it is unserviceable or if the required service is cost prohibitive. Products incurring service charges may be held for payment. Standard Imaging does not provide loaner products. See the Standard Imaging Warranty and Customer Responsibility for additional information.

21 Return Policy

No merchandise will be accepted for credit without prior approval of return. Please contact Standard Imaging's Customer Service Department to receive a return authorization number before returning any merchandise for exchange or credit. Products manufactured by Standard Imaging must be returned within thirty days of receipt of order in 'like new' condition. No credit will be given for products returned after thirty days from receipt of order. A minimum twenty percent restocking fee will be charged on all returned merchandise. All materials returned must be shipped pre-paid. Credit for returned goods will be issued to customer's account for use against future purchases of merchandise only. Special orders, custom products, re-sale (not manufactured by Standard Imaging) Products, and ADCL calibrations will not be accepted for return credit or exchange.

All products may not be registered, cleared, licensed or approved for sale in all countries or territories. Please contact Standard Imaging Customer Care for details.



EU	REP	Hoff & Lowendahl AB Högåsvägen 125 SE-741 41 Knivsta, Sweden
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Authorized representative for the EU is Hoff & Lowendahl AB Högåsvägen 125, SE-741 41, Knivsta, Sweden (SRN: SE-AR-000001888). Contact information: info@lowendahl.eu.



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