



The QC-Titrate™ is designed for laboratories requiring analysis of a few parameters. It has the ability to connect any of the Man-Tech Autosamplers and offers flexible sample preparation flexibility. It is a fully functional, "True Equilibrium" Titration and Ion Analysis system available at a very affordable price.

The QC-Titrate™ System has the following capabilities:

- Titration & Ion Analysis
- Back titration ability
- Built-in buret drive with 48,000 step/stroke resolution
- 2 galvanically isolated measuring electrode inputs
- 4 digital Pump control outputs
- Versatile sample handling & preparation
- Connect to any Man-Tech [Beaker Autosampler](#)
- Connect to any Man-Tech [TitraSip™ Autosampler](#)
- Thermistor for Temperature measurements & automatic temperature compensation



QC-Titrate Capabilities and Specifications

The QC-Titrate System, designed and manufactured by Man-Tech Associates, is designed to be the most capable titration system in the industry through software and automation capabilities. The QC-Titrate is not just a titration system as it has the capability for ion selective electrode and color analysis. Please find below specifications for the QC-Titrate.

Man-Tech has a commitment to innovative automated solutions and a number of the specifications below were first introduced into the marketplace by Man-Tech. Some have since been copied, while others are still unique to Man-Tech's QC-Titrate/PC-Titrate. These include:

- Man-Tech introduced the 'first' software based titration system in the world
- Man-Tech was the first to use XYZ Robotic autosamplers with a commercially available titration system
- Man-Tech was the first to add ion selective measurement to a titration system such as fluoride and ammonia
- Man-Tech revolutionized the titration industry by introducing the TitraSip, automatic pipetting system, to the PC-Titrate and QC-Titrate Systems
- Man-Tech introduced the TitraValve, multiple titrant delivery from a single buret drive
- Man-Tech introduced Turbidity AssayPlus
- Man-Tech introduced Color AssayPlus, a UV/VIS spectrophotometer completely controlled by a titration system

Specification	Advantage
Hardware	
Burets have 48000 step drive mechanism	This is the HIGHEST in the industry delivering the greatest accuracy. Around the endpoint, Man-Tech burets deliver the smallest injection increments.
Capability to connect additional sample preparation pumps	This allows for sample preparation, pH adjustment, etc. to be carried out automatically by the system directly in the sample.
Capability to connect temperature control device	As an addition to temperature compensation already included with the system, this will ensure that samples are analyzed at reproducible temperatures for accurate, defensible results
Capability to connect Beaker Autosampler System with height control	The Man-Tech XYZ Robotic Beaker Autosampler gives sample batch capacity from 18 to 179 samples per run depending upon the autosampler and sample cup selected. The height control capability ensures the conductivity is automatically separated from the pH and other electrodes eliminating salt interferences. Beaker Autosamplers can be upgraded to TitraSip autosamplers.
Capability to connect TitraSip Autosampler	The Man-Tech XYZ Robotic TitraSip Autosampler gives sample batch capacity from 55 to 179 samples per run depending upon the autosampler selected. The benefit of this system is automated pipetting and multi-parameter analysis from a single sample. For example, chloride, pH, alkalinity, conductivity and turbidity from a single sample.
XYZ Autosampler does not travel over unanalyzed samples	Eliminates potential for cross contamination.
Autosamplers include automated, expandable rinse station	Between every sample, the electrodes, stirrer, etc. are rinsed using an active pump system. The INTELLIGENT RINSE system will rinse to specific set pH, conductivity, etc. values that indicate the probes are clean and free of contamination. The system can connect additional rinse stations, if required, for more effective rinsing. For example, when running chlorides by argentometric titration, if the chloride concentration is high, a large amount of

	precipitate forms which will 'stick' to electrodes. This is effectively cleaned with a ammonium hydroxide rinse followed by deionized water.
Man-Tech only uses 'XYZ' Robotic autosamplers	These are extremely flexible and the industry standard throughout the world. Man-Tech 'XYZ' autosamplers have superseded historical carousel samplers due to their flexibility, control, sample capacity and quality. Three (3) autosampler bed sizes are available to match required customer through-put exactly. Both standard and custom sample cups are available.
Flexible application upgrades	PC-Titrate systems can be expanded to allow for upgrades to new applications in the future.
Software	
Capability of user defined Autorun buttons for all analysis and functions	Autorun buttons are user definable, GRAPHICAL and TEXT icons that reside on the computer desktop for maximum simplicity. Simply click the appropriate icon for any method, calibration, buret purge, autosampler home, anything and the analysis or function is completed. These icons are available on the computer screen WITHOUT having to select any menu options.
Capable of analyzing samples by titration, ion analysis and color within a single system	This means that in the same system, many different types of analysis may be completed in the same batch run or the same sample depending upon the autosampler type being used.
Capability of linear, point-to-point and quadratic calibration profiles, each with up to 16 different standards.	Necessary for accurate, precise pH, ion selective electrode (i.e., fluoride), conductivity, turbidity, color and UV measurements
Electrode stability by time, mV/s or delta mV/delta time	Necessary for accurate, precise pH and ion selective measurements.
Capability to enter user defined message prompts for analysis or function	Very useful for reminders or checks. For example, for titrant standardization and verification, the chemist is still required to fill the reservoir with titrant, when running this method; the software will come with a message asking whether the user has filled the reservoir bottle with the correct titrant. The chemist must enter a reply which is recorded for audit trail purposes. It serves as a reminder and a check.
Capability to enter user defined voice messages and/or prompts	Very useful for verbalizing failed QC checks, for verbalizing method steps as they occur, etc. It serves as a training too, a reminder and a check.
Automatically schedule prime, rinse, standardize titrant, check blanks and calibration routines to occur before chemist arrives for the day	The time associated with this is completed unattended before the chemist arrives and their time is devoted to running real samples only. This also checks quality of electrodes and titrants before starting.
Very flexible software that is usable	Software allows for almost any method to be completed. User definable actions include: <ul style="list-style-type: none"> - Link as many titration methods together as required - use of IF, ELSE, WAIT UTIL and WHILE functions for rinsing, sample preparation, calculations, pH, temperature, any measured/calculated sample result, titrations, flags, autosampler control, autodilution, etc. - movement of autosampler to specific sample position right from the sample entry table - unlimited number of calculations for any one sample - export and print results simultaneously - define special rinse routines for different samples -
In real time view results	At the time of user prompting in real time, view sample results with audit trail, QC results and calibration results analyzed up to that time.
Software allows for Rush/Priority Samples to be analyzed	Allows emergency samples plus continue analyzing the current set of samples after completion of the emergency sample.
Enables compliance to 21 CFR Part 11	Ensures defensible results are generated
Capability of Quality Control data and plots for sample results, electrode calibrations, duplicate analysis, spike	Very important for checking the integrity of the system on a daily basis and to see any trends such as electrode failure. The QC data and plots display graphically and numerically the values of the user entered maximum,

analysis, blank analysis, etc	minimum, target and the calculated mean and standard deviation values
Capability to link Quality Control parameters to real time actions	This is extremely important as it gives the capability to flag and/or re-analyze (with a TitraSip) and/or terminate the run, etc. if a QC sample fails the acceptable range for both minimum/maximum and standard deviation limits.
Ability to import Sample identification tables and export data	This saves the time required for sample ID entry and eliminates the potential for transcription errors.
Customizable Sample Reports	Customizable reports allow the user to design the format of reports to fit their own requirements. Historical reports offer the ability to look-up previously stored or archived data.
Passwords	Password administration provides the ability to lock methods from modification and simplifies the menu screen by deactivating unused or unwanted menu selections.
Data Storage	Save or backup methods and data on a floppy, zip drive or network for storage.
Technical Support/Installation/Manufacturing	
Man-Tech is the manufacturer of the QC-Titrate System	Ensures effective support and parts availability
Installation by Man-Tech Personnel who are degreed chemists	Ensures effective installation and training with a chemistry background.
In-house applications lab, technical support and 3 service centers	Effective support with toll free line since we are the manufacturer and not a distributor. Enduser may send samples and degreed chemists will develop methods. Loaner instruments are normally provided within 24 hours if any service concerns arise.
Portable s/w database provides easy application support via email, reduces need for costly field service calls	Allows Fast, Effective, and Low Cost applications support and training, by MAN-TECH service personnel with minimal time delay.