YELLOW JACKET®

ManTooth™-V Wireless Vacuum Gauge

ManTooth™-PTV Wireless Digital Vacuum & P/T Gauge

User's Manual

Made for iPhone iPad

Made for iPhone SE, iPhone 6s, iPhone 6, iPad mini 3, iPad Air, iPad mini 2

"Made for iPhone" and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPhone, or iPad may affect wireless performance.

Bluetooth®

Available on the App Store

GET IT ON Google play

Before You Start

Contacting Ritchie

To order accessories, receive assistance, or locate the nearest YELLOW JACKET distributor.

Safety Information

Use the instrument only as specified in this manual. Otherwise, the protection provided by the instrument may be impaired. Refer to the safety information.

A Warning identifies conditions and actions that pose hazards to the user. A Caution identifies conditions and actions that may damage the instrument or the equipment under test.

Warning

To avoid personal injury or death, follow these guidelines:

- Most governments and legal authorities require that HVAC technicians be trained and certified in the safe and proper operation of HVAC tools, such as this instrument. Since this tool may be connected to many types of equipment through a limitless combination of hoses and fittings, proper training is the most important element of using this tool safely.
- Read the entire Users Manual before using the instrument.
- Use the instrument only as described in this Users Manual, otherwise the protection provided by the equipment may be impaired.
- Do not use the instrument if it is damaged. Before you use the instrument, inspect the case. Look for cracks or loose components.
- The instrument contains no internal user serviceable parts
- Do not open the instrument.
- Have the instrument serviced only by Ritchie Engineering Co. or authorized service centers.
- Do not use the instrument if it operates abnormally. Protection may be impaired. When in doubt, have the instrument serviced.
- Do not operate the instrument around explosive gas, vapor, or dust.
- Various refrigerants have been intentionally excluded for very significant safety reasons.
- Never use refrigerants in this instrument that are not listed in the Set-up menu.
- The refrigerant database in this unit may include refrigerants classified as flammable. If such refrigerants are selected, the operator may need additional certifications and/or training. Consult your government and legal authority and comply fully with all requirements.
- Always wear eye and skin protection when working with refrigerants. Escaping refrigerant vapors will present a freezing danger. Do not direct

refrigerant vapors venting from hoses towards the skin.

- Maximum Working Pressure: 700 psia (4.83 MPa)
- Because this instrument allows for various inputs including electrical and mechanical, care must be taken to observe any ways that an electrical shock hazard could develop. Example: Wet or humid conditions, along with a sensor, could allow an electrical path across the instrument. Keep all interconnected equipment clean, organized, and in proper condition. Do not use the instrument if you are not qualified to recognize potential electrical faults.

Caution

To avoid damage to equipment, follow these guidelines:

- Do not allow pressures beyond the specifications listed in this manual.
- Do not attempt to introduce liquid or samples heavily laden with oil into the instrument.
- Read and observe instructions and specifications related to the batteries used in this instrument that may cause damage to it.
- Do not use this instrument on systems containing leak sealing chemicals. These leak sealants can collect and harden in the instrument, causing permanent damage.
- Do not use damaged USB chargers to recharge the ManTooth PT Module as this could damage the circuitry and/or battery.
- USB charging cable must be less than 3 meters in length.
- Only use with refrigerants approved for use with the ManTooth Module. Use of unapproved refrigerants may cause damage to the ManTooth Module. A complete list of approved refrigerants can be found in the ManTooth RSA app in the “Select Refrigerant” option.

Getting Started

The ManTooth Module is a precise instrument to accurately measure and report the critical information needed to service refrigeration and air-conditioning equipment. The ManTooth Module reports the system information directly to your smartphone or tablet by means of a class 1 Bluetooth v.2.1 radio. The ManTooth Module is compatible with any iOS device running iOS 8.2 or later and Android devices running Android 4.1 (Jelly Bean) or later.

Before you use your ManTooth Module for the first time you should make sure that it is fully charged. You will also need to download the free ManTooth RSA APP from the Apple App Store for iOS devices for the Google PlayStore for Android devices.

You can either use the QR code links that are on your ManTooth Module packaging, follow the links that are available on YellowJacket.com, or just search for Yellow Jacket ManTooth in either app store.

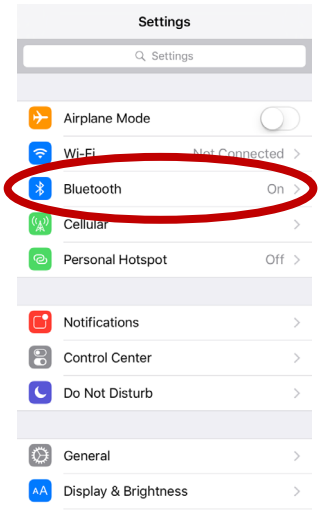
Pairing

To display service readings your ManTooth Module must be connected via Bluetooth to an iOS phone or tablet running iOS 8.2 or an

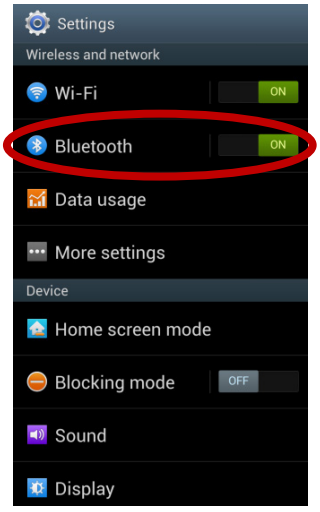
Android phone running Android 4.1 (Jelly Bean) or later. To connect your ManTooth Module to your phone or tablet the two must first be paired to one another. The pairing of the module to your device is done in your phone or tablet's settings.
Note you only need to pair your ManTooth Module the first time you connect it to your phone or tablet, however, if you force your phone or tablet to "forget" your ManTooth Module you will need to re-pair.
Note Your ManTooth Module can be paired with multiple devices at the same time. However, it can only be connected and sending readings to one phone or tablet at a time.

To pair your ManTooth Module you first need to open the settings menu on the phone or tablet you wish to pair to your ManTooth Module. Next tap on "Bluetooth" to enter the Bluetooth settings. Be sure to turn your phone or tablet's Bluetooth radio on if it is not already on.

Apple iOS



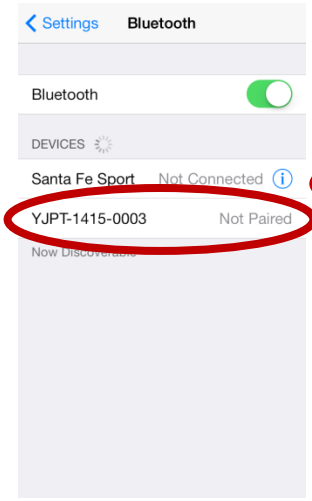
Android



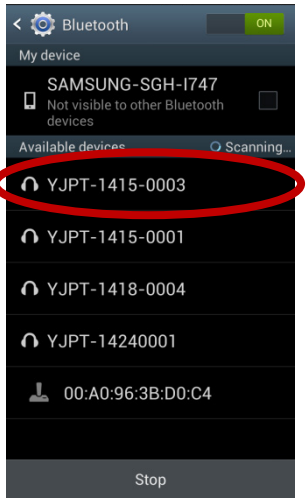
Next turn your ManTooth Module on by pressing and releasing the power button on the main module.

The module will go through a brief start up sequence then the light on your ManTooth Module should start to blink blue. This means that your ManTooth Module is search for available Bluetooth devices to connect with. Next, if you are using an Android phone, tap on "Scan" at the bottom of the screen to scan for available devices. Apple iOS devices should automatically scan for available Bluetooth devices.

Apple iOS



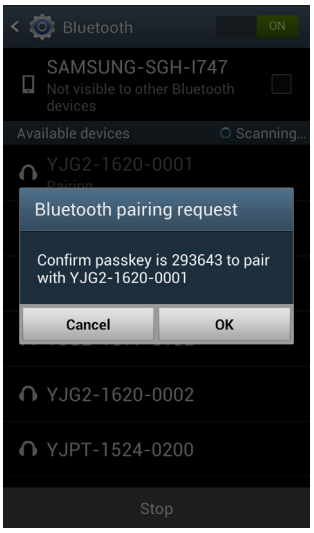
Android



Your ManTooth Module should then show up as an available device to pair with on your phone or tablet's screen. This may take up to 30 seconds.
Note Your ManTooth Module's name is the same as the serial number and is printed on the main module's label.

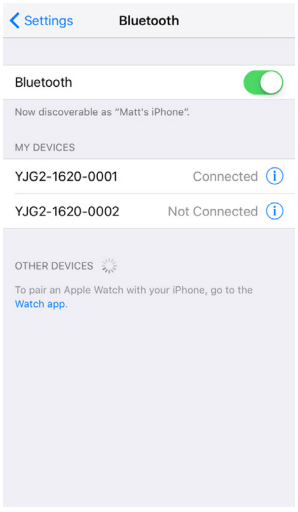
Once your ManTooth Module shows up as an available device tap on it's name to pair it with your phone. On Android systems a "Bluetooth pairing request" alert may pop up asking to confirm the passkey tap on "OK" to continue.

Android

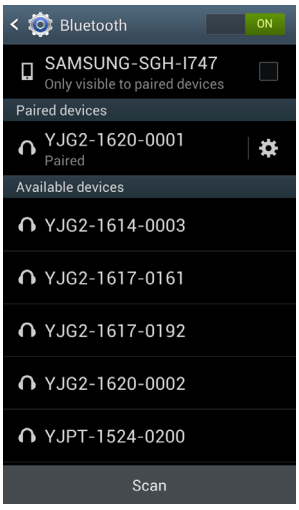


After pairing your Apple iOS phone or tablet to your ManTooth Module it should show up as "Connected." On Android devices your ManTooth Module should show up under the "Paired Devices" section on the Bluetooth settings screen.

Apple iOS



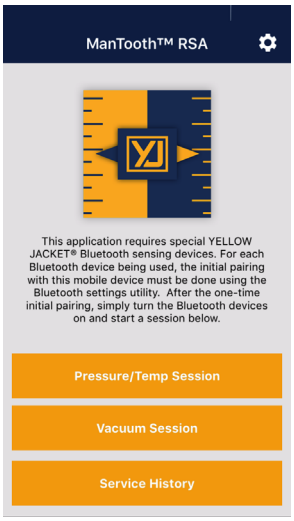
Android



On Apple iOS devices, once your ManTooth Module is paired the light on the module will glow a solid blue. However, on all Android devices or if your iOS device lists your ManTooth Module as "Not Connected" the light will continue to blink blue. This is normal.

ManTooth RSA App

This section will go over the various functions, settings, and procedures of the ManTooth RSA.



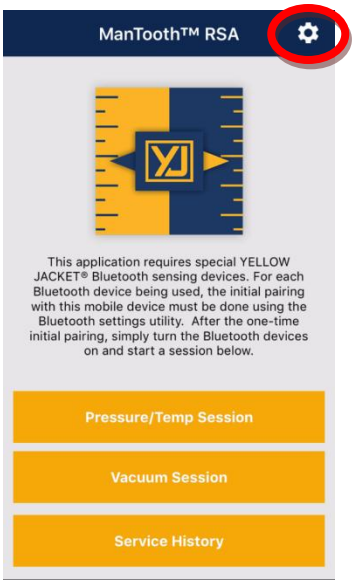
If you have not already downloaded the Yellow Jacket ManTooth RSA App go to either the Apple App Store or the Google Play Store now to download the free app. You can either use the QR code links that are on your ManTooth Module packaging, follow the links that are available on YellowJacket.com, or just search for Yellow Jacket ManTooth in either app store.

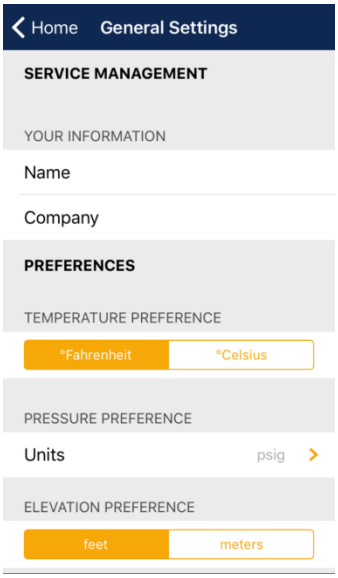
General Settings

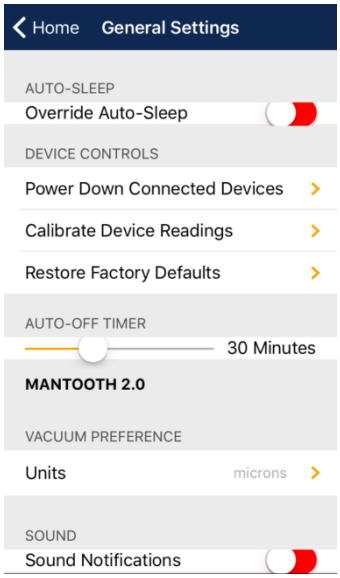
The General Settings menu is where you can set up and change various functions of your ManTooth RSA app to personalize it for your specific needs.

To access the general settings on the first screen available upon opening the ManTooth RSA app tap on the gear in the upper right corner of the screen.

General Settings







Service Management

Your Information

Here you can set your own name and your company name. This information will automatically appear in the e-mails containing the system readings screenshots and data logs which you can send directly from within the app.

Preferences

Temperature Preference

Set the units that the temperature readings from the temperature sensors, Vapor Saturation, Liquid Saturation, and the values for Superheating and Subcooling are displayed in. Options are degrees Fahrenheit (°F) or degrees Celcius (°C). Default temperature units are degrees Fahrenheit (°F).

Pressure Preference

Set the units that the pressure readings are displayed in. Available units are pounds per square inch absolute (psia), pounds per square inch gauge (psig), bar, kilopascals (kPa), Megapascals (MPa), and kilogram per square centimeter (kg/cm^2). The default pressure units are pounds per square inch gage (psig)

Elevation Preference

Set the units of measure for elevation. Available units are feet and meters. The default elevation unit is feet.

Device Management

Auto Sleep

This option will disable your phone or tablet's automatic sleep function so that while you are in a session taking readings your phone or tablet will not automatically go to sleep which could disrupt your session and readings. The default auto sleep setting is Override Auto Sleep = Off.

Power Down Connected Devices

This is another way of shutting off your connected ManTooth Module(s) if you are not near enough to your module(s) to press the power button(s) and want to turn the power completely off.

Calibrate Device Readings

This gives you the option to adjust the calibration of your ManTooth Module's pressure, temperature, or vacuum readings away from the factory defaults.

Restore Factory Defaults
This will clear any calibration adjustments that have been done on the ManTooth Module since it left the factory.

Update ManTooth (Android Only)
This feature allows owners of ManTooth PT modules to update the BlueTooth radio settings of their devices for improved connectivity. **Note**All ManTooth-V and ManTooth-PTV modules already have these new radio settings. For owners of ManTooth PT modules that have their modules paired to an iOS device, these new radio settings can be installed, but the user will have to pair the modules to an Android device with the ManTooth app. Once the radio settings have been updated through the Android device, the user can re-pair their ManTooth PT modules with their iOS device. These radio settings greatly improve the "Quick Start" function discussed later this in manual.

Auto-Off Timer
This slider gives you the option of having your ManTooth Module automatically turn itself off after a designated period of time. It can be set anywhere from 1 to 90 minutes. After the ManTooth Module has been connected for the specified auto-off time an alert will pop up asking if you would like to reset the auto-off timer. If you wish to reset the timer simply tap anywhere on the screen. Also included is an auto-off "Never" setting. Moving the slider all the way to the left will set the auto off timer to "Never". Default is Auto-Off = 5 min.

ManTooth 2.0

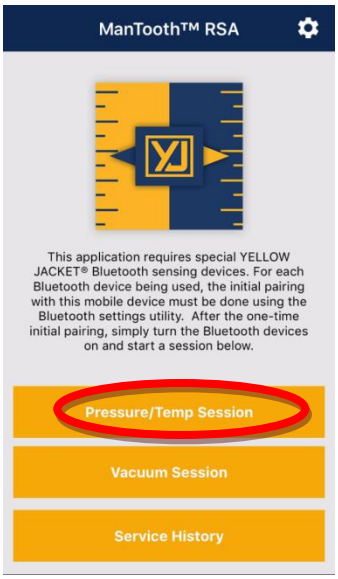
Vacuum Preference
Set the units that the vacuum readings are displayed in. Available units are microns, milliTorr (mTorr), Torr, millimeters of mercury (mmHg), millibar (mbar), kilopascals (kPa), and Pascals (Pa). The default vacuum units are microns.

Sound
This slider gives you the option to turn sound notifications on or off. The default sound setting is "Off"

Getting Back to the Previous Screen

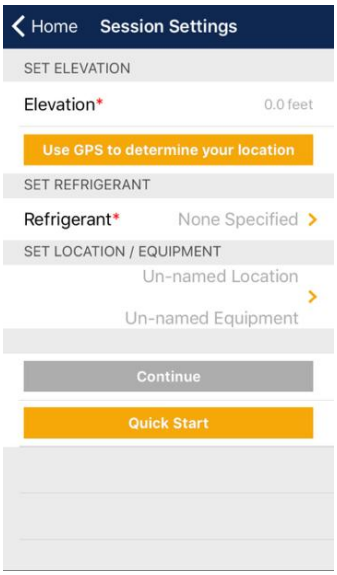
To return to the previous screen from the one you are currently viewing tap on the icon in the upper left hand corner. This function is the same in all of the screens in the ManTooth RSA App.

Pressure/Temp Session



Sessions are where you connect your phone or tablet with your ManTooth Module to see and collect system readings. To begin a new pressure/temperature session tap on "Pressure/Temp Session" in the App home screen.

Session Settings



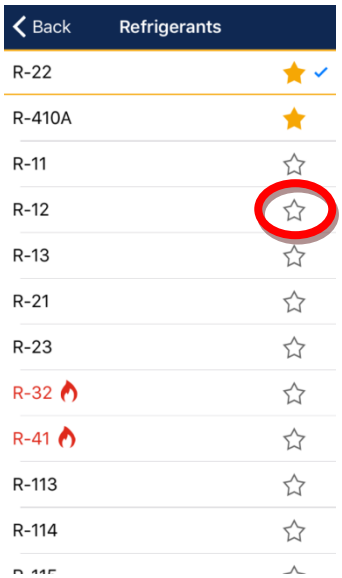
Using the correct settings that are specific for the current system you are servicing will ensure the best possible pressure readings as well as liquid and vapor saturation values.

Set Elevation

Setting the elevation will enable your ManTooth RSA app to correct for elevation pressure variations allowing for more accurate pressure readings. You may either use your phone or tablet's built in GPS to determine your elevation or input the elevation manually by tapping on the elevation and entering your elevation above sea level. **Note** "Use GPS to determine your location" functionality may not work on all devices especially those without cellular service.

Set Refrigerant

To set the refrigerant for the current session tap on "None Specified" then scroll through the list of over 100 NIST refrigerants and select the refrigerant corresponding to the unit you will be servicing. **NOTE** Setting a refrigerant is mandatory before moving to the next screen.



To save a "favorite" refrigerant, click on the "star" icon next to the refrigerant. Once a refrigerant is selected as a favorite, the star will turn yellow and that refrigerant will move to the top of the refrigerants list for subsequent sessions. The "check mark" indicates the refrigerant that has been selected for this session.

**************WARNING**************

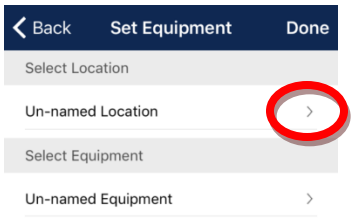
Refrigerants classified as flammable are in red text with a "flame" icon. If such refrigerants are selected, the operator may need additional certifications and/or training. Consult your local government and legal authority and comply fully with all requirements.

****

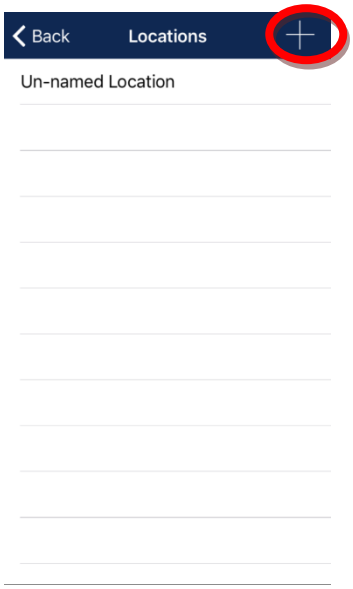
Set Location/Equipment

If you want to organize your saved data in "Service History", you can enter the location information for the current service session. This information will show up in the service reports you can email and is how the service history will be organized. Here you have the ability to either add a new location or select an existing location. Once you have designated a location you can also designate what equipment is being serviced during the session. Locations can have

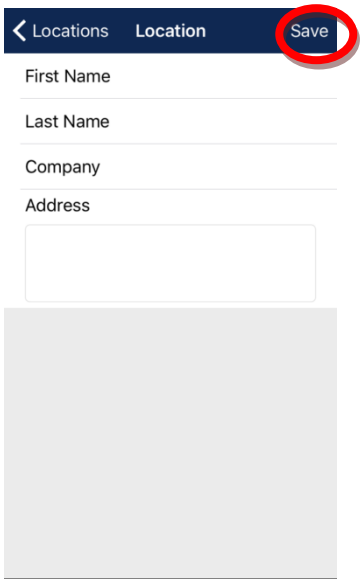
multiple pieces of equipment associated with them so you can keep track of each individual unit at locations that may have more than one system. Saved session data will be saved to “Service History” in the app’s main menu and sorted first alphabetically by business name or customer last name, then alphabetically by assigned equipment name, and lastly by the date and time the data was saved. **Note** Location and equipment details are optional. If you do not wish to add location and equipment information, “Un-named Location” and “Un-named Equipment” can be selected. This data is saved to the “Service History” under “Un-named Location” and is sorted simply by date and time. <u>You *can not* assign a location to data at a later time.</u>



To select the location, click on the arrow next to the default location.

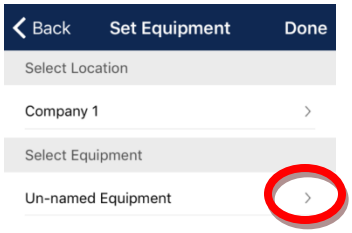


This screen will show a list of all saved locations. To select a saved location or to use the “Un-named Location”, click on the desired location from this list. If a new location is desired, click on the “+” icon in the upper right-hand corner of the screen (lower right-hand corner for Android users).

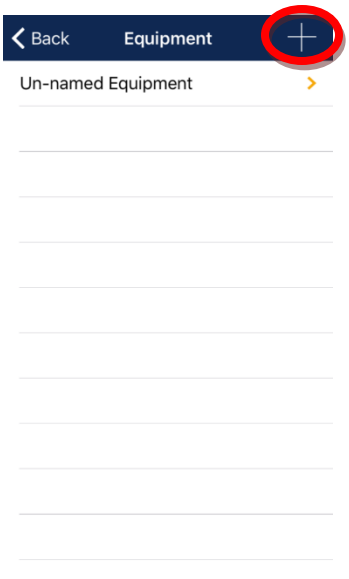


A location information entry screen will appear, allowing the input of a first and last name, company name, and location address. **Note** A “last name” or “company” is required to save a new location. All other entries are optional. Once the location

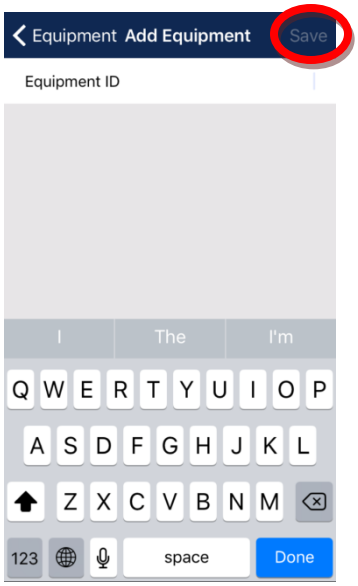
information has been entered, click on the "Save" button to return to the Location/Equipment selection screen.



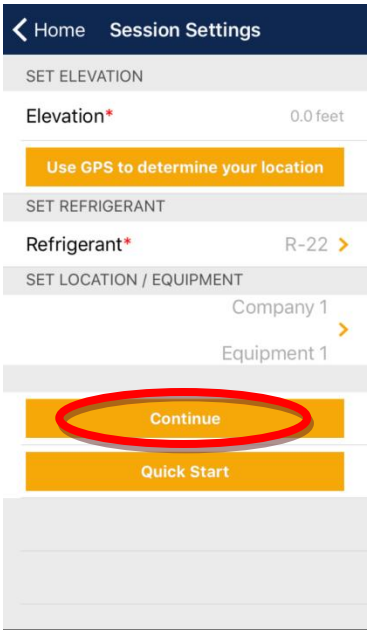
With the location selected, the corresponding equipment can now be selected. Click on the arrow next to the default equipment.



This screen will show a list of all saved locations. To select a saved location or to use the "Un-named Location", click on the desired location from this list. If a new location is needed, click on the "+" icon in the upper right-hand corner of the screen (lower right-hand corner for Android users).

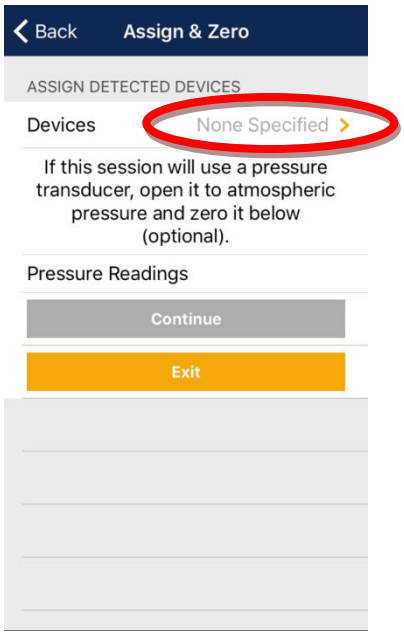


An equipment ID can now be entered. This could be a brief description of the equipment and/or model/serial number. Once the equipment information has been entered, click on the "Save" button to return to the Location/Equipment selection screen. Once the location and equipment have been selected, click "Done" for iOS users or "Confirm Settings" for Android users to return to the Session Settings screen.



Once all of the session settings have been established, click “Continue”. **Note** The “Quick Start” feature is not available until after a standard session has been started and saved. However, for subsequent sessions, this “Quick Start” feature can be utilized to bypass the ManTooth Module assignment process and will navigate directly to the readings screen when connecting to the same ManTooth Module(s) used during the previous saved session. Android users will be prompted to “confirm” assignment of the ManTooth Module(s) when using “Quick Start”.

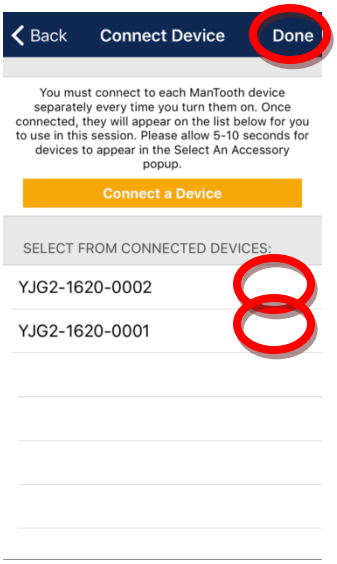
Assign Devices and Zero



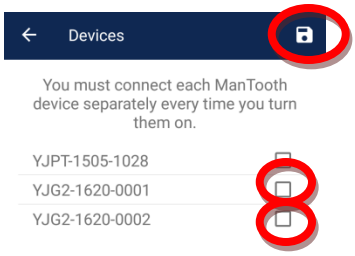
Assign Detected Devices

Now you are ready to connect your ManTooth module to your current session. To connect your module, first click “None Specified”, this will take you to the module selection screen.

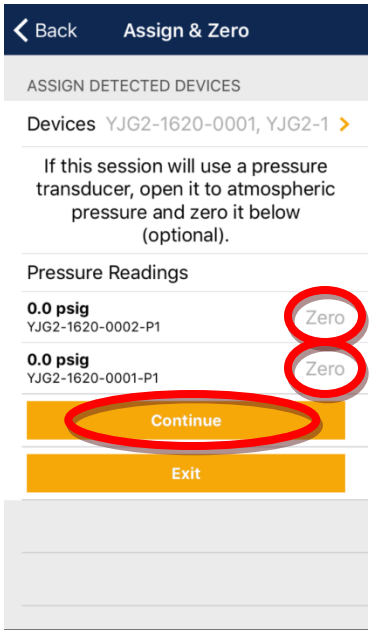
iOS



Android



Tap on the ManTooth Module(s) that you wish to connect to your session from the list of devices that are displayed. Remember your Module’s name is the serial number printed on the main label and should take the form of YJPT-XXXX-XXXX for PT modules or YJG2-XXXX-XXXX for ManTooth-V and ManTooth-PTV modules. Next tap the save icon in the upper right corner of the screen to save the module(s) to the session. **Note** On iOS devices, the ManTooth Module(s) should have been connected to your smart device as described in the “Getting Started” section above. If they are not connected, you must tap on “Connect a Device” to first connect your device to your phone or tablet and then select it under the “Select An Accessory” heading to fully connect it to your session. **Note** to connect to your ManTooth Module(s), they must be turned on and searching for a connection (where the blue light is blinking).



Zero Pressure Readings

After you save your module(s) to the session they will be displayed at the top of the screen under "Assign Detected Devices". The pressures from the connected module(s) will be displayed at the bottom of the screen. To zero the pressure transducer readings tap on "Zero" next to the corresponding pressure. **Note** It is recommended that you zero the pressure transducer(s) at the beginning of each new session before connecting your ManTooth Module(s) to a system. This will ensure the most accurate device readings. Once the readings are zeroed, the ManTooth Module(s) should be attached to the system, then click "Continue" to proceed to the readings screen.

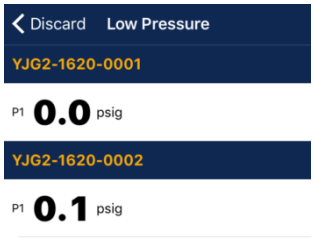
Readings

The readings screen will display the pressures and temperatures as measured by the ManTooth Module(s), display the liquid and vapor saturation values, as well as calculate and display the superheat and subcooling values.

The first time you connect your ManTooth Module(s) to a new phone or tablet you will have to assign the pressure transducers and temperature sensors. These assignments are not permanent and can be changed at anytime. **Note** the pressure transducer in every ManTooth Module is capable of accurately reading pressures up to 700 psia (48.3 bar) and therefore can reliably be used on either the high or low side.

Pressure

To assign pressure readings to either the high or low side simply tap on the box that contains the value you wish to assign and select the sensor that you want to assign to that spot.



Liquid and Vapor Saturation

Liquid and Vapor Saturation values are calculated automatically by the app based on the measured

pressure and the refrigerant selected.

Temperature

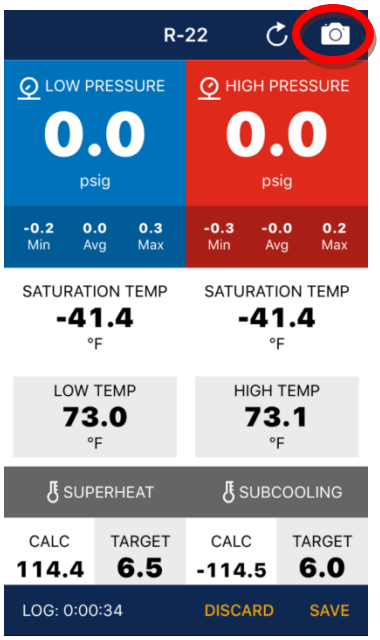
To assign temperature readings to either the high or low side simply tap on the box that contains the value you wish to assign and select the sensor that you want to assign to that spot.

Subcooling and Superheat

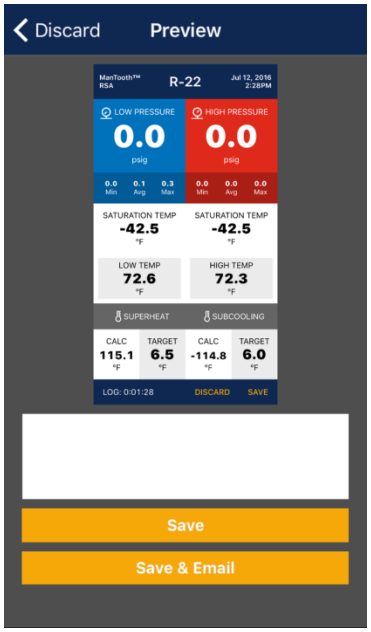
To set the subcooling and superheat values tap on the “Subcooling” or “Superheat” target box and enter the data requested. For subcooling just enter the desired value for subcooling. For superheat enter the outdoor dry bulb temperature and the indoor wet bulb temperature. The app will then take this data and automatically calculate the target superheat value. Once you have entered the necessary information save the values by tapping on the save icon in the top right corner of the screen.

Saving & Sharing Data

There are two ways to save and share data with the ManTooth RSA app, screenshots and data logs.

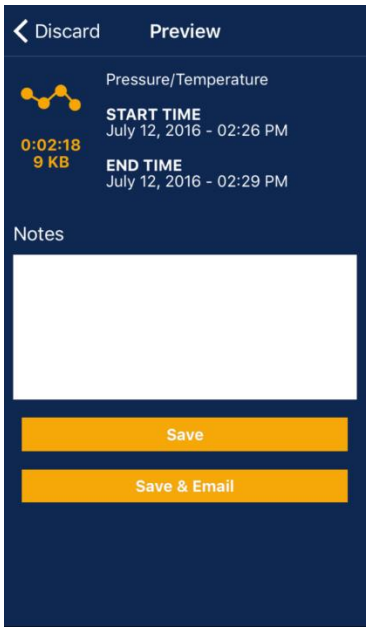


Screenshots can be taken from the readings screen to show the readings at any given point in the session. To save the data currently on the screen tap on the screen shot icon on the top right corner of the readings screen.



A preview of the screenshot is shown, which includes the system pressure and temperature readings, saturation temperatures, superheat and subcooling values, the refrigerant selected, and the date and time of the screenshot. The white box below the preview is where notes can be added and saved with the screenshot. The screenshot can be saved to the app “Service History” or it can be saved and emailed. If “Save & Email” is selected, your phone or tablet will launch the email program configured to your device. The screenshot will be attached to the email and the email body includes the service details, along with any notes that have been added from the preview screen above.

Data logs can be saved by clicking “Save” in the lower right corner of the readings screen. The data log contains all of the assigned system readings taken every second of the session.



A preview of the data log is shown, displaying the start and end time of the session. As with screenshots, notes can be added to the data log files by clicking on the white box under the preview. The data log can be saved to the app "Service History" or it can be saved and emailed. If "Save & Email" is selected, your phone or tablet will launch the email program configured to your device. The data log will be attached to the email in CSV format and the email body includes the service details, along with any notes that have been added from the preview screen above.

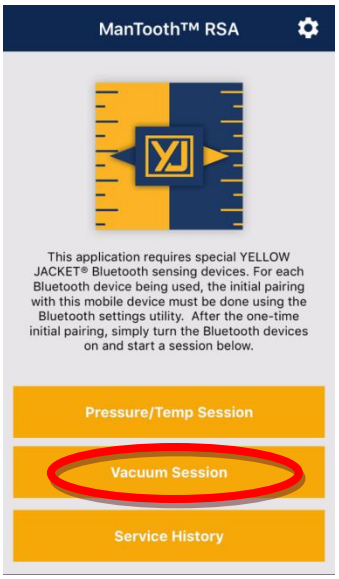
Other Buttons

There are two additional buttons on the readings screen.

The first is a refresh button next to the screenshot button at the top of the screen. This will reset the minimum, maximum, and average readings of the session. This function is especially useful for determining system stability.

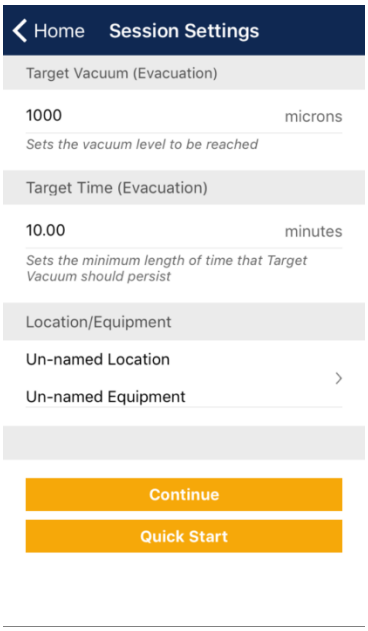
The other option is "Discard" at the bottom of the readings screen. This will not only exit the readings screen but will take you all the way back to the home screen of the ManTooth RSA app. If you choose to "Discard" a session, the session data is not saved and CANNOT be retrieved at a later time.

Vacuum Session



To begin a new vacuum session tap on "Vacuum Session" in the App home screen.

Session Settings



Target Vacuum (Evacuation)

Click on the value below "Target Vacuum" to establish the target vacuum level to be reached during this vacuum session.

Target Time (Evacuation)

Click on the value below "Target Time" to establish the minimum length of time that the target vacuum should persist.

Location/Equipment

If you want to organize your saved data in "Service History", you can enter the location information for the current service session. This information will show up in the service reports you can email and is how the service history will be organized. Here you have the ability to either add a new location or select an existing location. Once you have designated a location you can also designate what equipment is being serviced during the session. Locations can have multiple pieces of equipment associated with them so you can keep track of each individual unit at locations that may have more than one system. Saved session data will be saved to "Service History" in the app's main menu and sorted first alphabetically by business name or customer last name, then alphabetically by assigned equipment name, and lastly by the date and time the data was saved. **Note** Location and equipment details are optional. If you do not wish to add location and equipment information, "Un-named Location" and "Un-named Equipment" can be selected. This data is saved to the "Service History" under "Un-named Location" and is sorted simply by date and time. You *can not* assign a location to data at a later time.

For more details on setting location and equipment, see the "Pressure/Temp Session" section above.

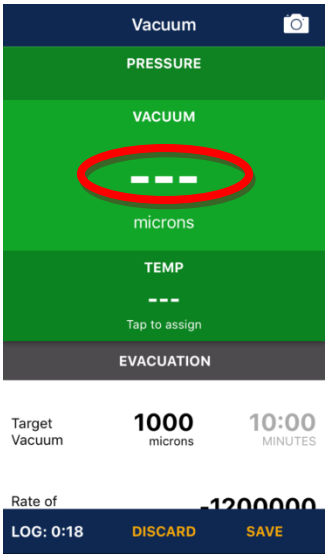
Once all of the session settings have been established, click "Continue". **Note** The "Quick Start" feature is not available until after a standard session has been started and saved. However, for subsequent sessions, this "Quick Start" feature can be utilized to bypass the ManTooth Module assignment process and will navigate directly to the readings screen when connecting to the same ManTooth Module(s) used during the previous saved session. Android users will be prompted to "confirm" assignment of the ManTooth Module(s) when using "Quick Start".

Assign Devices

The device assignment process is identical between the pressure/temp session and the vacuum session. For details, see the "Pressure/Temp Session" above. **Note** The vacuum gauge must be plugged into the ManTooth Module that is being assigned to continue.

Readings

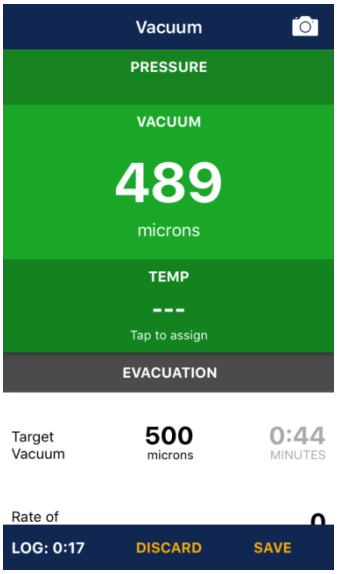
The readings screen will display the vacuum level as measured by the vacuum gauge plugged into the connected ManTooth Module. It also displays the target vacuum values set on the session settings screen along with the vacuum rate of change.



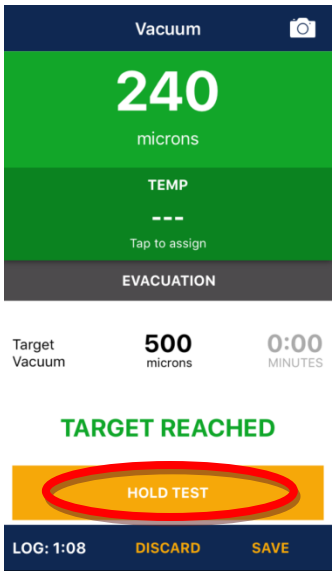
The first time you connect your ManTooth Module to a new phone or tablet you will have to assign the vacuum gauge reading.

To assign the vacuum or temperature readings simply tap on the box that contains the value you wish to assign and select the sensor that you want to assign to that spot.

Evacuation Mode



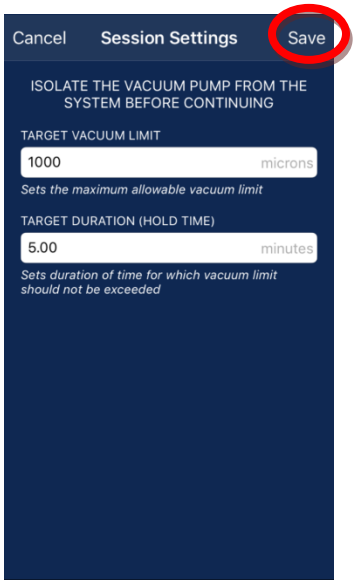
Each vacuum session begins in Evacuation Mode. Once the vacuum reading has reached the target vacuum level established in the session settings, the target time will begin to countdown. If the vacuum level increases to a value greater than the target vacuum level once the timer has started, the countdown timer will reset to the originally established target time and will resume once the reading returns to the target vacuum level.



When the target vacuum level has been maintained for the target time, a notification appears stating "TARGET REACHED" and the Hold Test Mode can be initiated.

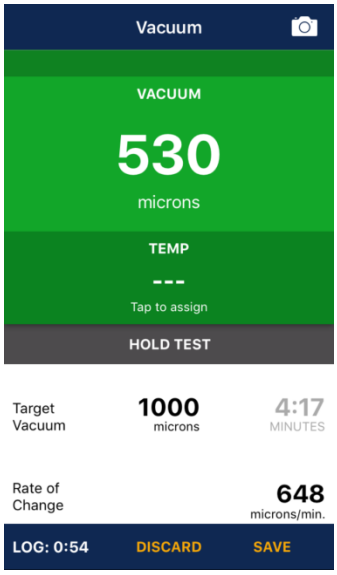
Hold Test Mode

The Hold Test Mode is used to confirm that a system has been completely evacuated and that no leaks or moisture are present in the system. Before continuing with the hold test, isolate the vacuum pump from the system.

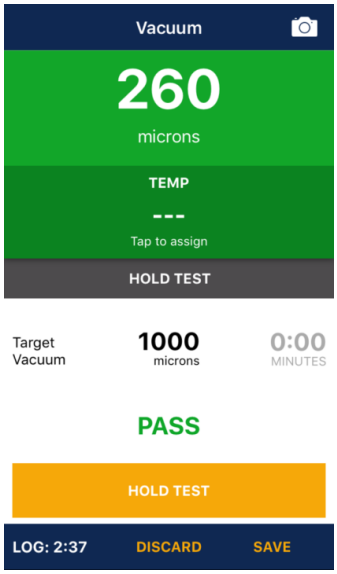


Similar to the session settings screen at the beginning of the vacuum session, the hold test settings screen allows you to input a target vacuum limit and a target

duration (hold time). Click on the value below "Target Vacuum Limit" to establish the maximum allowable vacuum reading during the hold test. Click on the value below "Target Duration (Hold Time)" to establish the duration of time for which the vacuum limit should not be exceeded. Once these values have been set, click "Save" in the upper right corner of the screen.



The readings screen is now in Hold Test Mode. As long as the vacuum reading remains below the target vacuum limit, the timer will continue to countdown. If the vacuum reading rises above the target vacuum limit, the hold test will display a "FAIL" notification and the hold test can be restarted once the vacuum reading falls back below the target vacuum limit.



If the target vacuum limit is not exceeded during the target duration, a "PASS" notification is displayed.

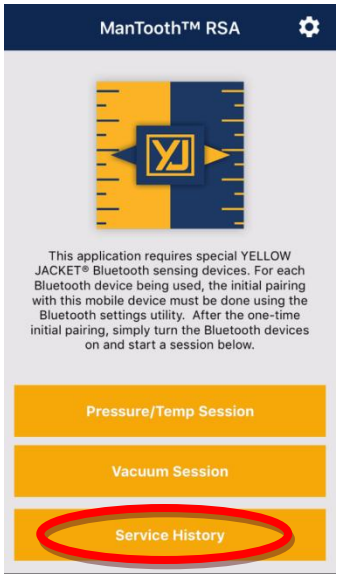
Saving & Sharing Data

At any point in the vacuum session (Evacuation Mode or Hold Test Mode) data can be saved and shared. For more details on the saving of screenshots and data logs, see "Pressure/Temp Session" above.

Other Buttons

If you want to leave the vacuum session without saving any data, click "Discard" at the bottom of the readings screen. This will not only exit the readings screen but will take you all the way back to the home screen of the ManTooth RSA app. If you choose to "Discard" a session, the session data is not saved and CANNOT be retrieved at a later time.

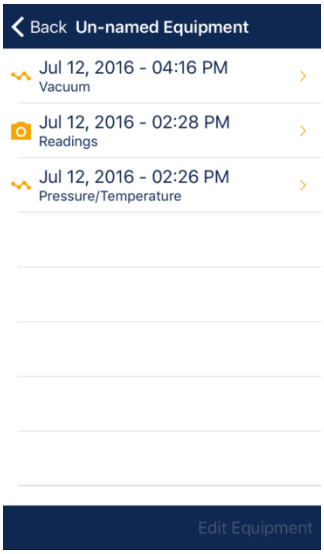
Service History



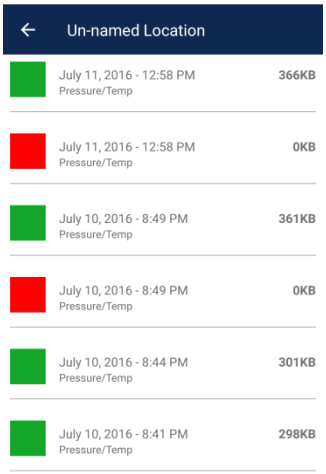
Service History contains all of the saved screenshots and data logs from previous Pressure/Temp Sessions and Vacuum Sessions. Service History is also a place to enter new locations and/or equipment. You can also edit or delete existing locations and/or equipment in this section.

To view saved screenshots and data logs, navigate to a specific location and equipment. Once the location and equipment have been selected, a list of all saved data associated with the selected equipment will appear with a time stamp in order of session start date, with the newest session data at the top of the list.

For iOS



For Android



On iOS devices, saved screenshots are saved with the "camera" icon identical to the button used to take the screenshot from the readings screen. Data logs show a zig-zag line. On Android devices, saved screenshots are saved with a green square icon whereas data logs are saved with a red square icon. Any of these saved data items can be selected and shared or deleted. For more information on sharing data, see the Pressure/Temp Session "Saving and Sharing Data" section above.

ManTooth-V™ Module

ManTooth-PTV™ Module

1: Status Light
2: Device Name
3: Power Button
4: ¼ inch flare fitting vacuum gauge
5: Micro USB charging port
6: High-strength magnet
7: Temperature probe and vacuum gauge jacks
8: ¼ inch flare fitting pressure transducer connection
9: ¼ inch flare fitting with Schrader core pressure transducer connection
10: ManTooth thermistor temperature clamp

Status Light

The multi-colored LED indicates the status of your ManTooth Module.

Blinking Blue: The module is on and searching for a Bluetooth connection. This will continue from when you turn on your ManTooth Module until you connect to it within the ManTooth RSA Pressure/Temperature app.
Note If your ManTooth Module loses connection to your phone or tablet it will automatically revert back to this searching for a connection mode.

Solid Blue: The module is on and connected to a phone or tablet via Bluetooth.

Solid Green: The module is connected to a power source via the Micro USB port and is charging. **Note** once the unit is fully charged the green light will turn off.

Blinking Red (Short): The module will blink short flashes of red to indicate that it is sending data to a connected device. This will occur while the light is solid blue.

Blinking Red (Long): The module will flash long blinks of red when the battery level is below 10% of total life remaining.

Device Name

Your ManTooth Module's name is displayed right on the label for easy reference. The name takes the form of YJG2-XXXX-XXXX. The device name serves as your ManTooth Module's name within the ManTooth RSA app, its serial number, as well as its Bluetooth name that will appear on your phone or tablet when pairing.

Power Button

To turn your ManTooth Module on or off push and release the power button once. When turning your ManTooth Module off, hold down the power button until the red light turns off (about 2 seconds).

¼ Inch Flare Fitting Vacuum Gauge

The vacuum gauge plugs into the back of both the ManTooth-V™ and ManTooth-PTV™ Modules.

Micro USB Charging Port

The ManTooth PT Module is designed to be charged using any standard Micro USB charging cord and corresponding USB charger. **Note** the charging cord must be less than 3 meters in length.

High-Strength Magnet

The high-strength Neodymium magnet on the ManTooth-V™ Module allows for this module to be attached to a metallic surface while taking vacuum readings.

Temperature Probe and Vacuum Gauge Jacks

Each ManTooth Module is equipped with 2 jacks for use with ManTooth Temperature Clamps and/or the ManTooth Vacuum Gauge.

¼ Inch Flare Fitting Pressure Transducer Connection

The flare fitting on the front of the ManTooth-PTV™ Module directs to the pressure transducer with a working pressure range of 0-700 psia. The fitting is equipped with an "Adjust-a-Valve" opener and sized to fit most system access ports for easy access to most AC and refrigeration units. The compact size of the ManTooth-PTV™ Module and no hose connection system reduces charge loss that can occur from hoses used in charging through a standard test and charge manifold. Adapters to connect the ManTooth-PTV™ Module to other size access ports are available from Yellow Jacket.

¼ Inch Flare Fitting With Schrader Core Pressure Transducer Connection

The Schrader core fitting on the ManTooth-PTV™ Module allows for recovering refrigerant, adding charge, or removing charge all without

disconnecting your ManTooth-PTV™ Module from the system.

ManTooth Thermistor Temperature Clamp

The thermistor pipe clamp probe is capable of clamping to and measuring the temperature of pipes ranging in size from ¼ inch to 1 ⅜ inches. The probe is capable of measuring with an accuracy of 0.2°C from 0°C to 70°C with a full range of -40°C to 130°C. For best long term stability of your thermistor pipe clamp probe avoid storing it at temperatures exceeding 75°C (167°F).

Instrumentation Specification	
Pressure Sensing Resolution	0.1 psi, 0.1 psia, 0.01 bar, 1 kPa, 0.001 MPa, 0.01 kg/cm^2
Pressure sensing accuracy	0.5% of full scale at 25°C 1% of full scale 55°F to 130°F 2% of full scale -40°F to 248°F
Working Pressure	0 to 700 psia (48.3 bar)
Proof Pressure	Tolerable pressure without internal damage 1000 psia
Burst Pressure	Tolerable pressure without loss of seal 1500 psia
Temperature Sensor Range (instrument)	Sensing element -40°F to 266°F (-40°C to 130°C) Max Cord temp 176°F (80°C) Max Clamp Temp 203°F (95°C)
Temperature Display Resolution	0.1°F or °C
Temperature Accuracy (Instrument)	±0.2°C (±0.36°F)
Vacuum Sensing Resolution	1 micron, 1 mTorr, 0.001 Torr, 0.001 mmHg, 0.001 mbar, 0.0001 kPa, 0.1 Pa
Vacuum Sensing Accuracy	+/- 20% from 25 microns to 10,000 microns
Vacuum Range	6 microns to 100,000 microns
Working Temperature	-4°F to 160°F Limited by battery
Storage Temperature	-4°F to 160°F For best battery performance do not store at over 100°F
Working humidity	0 to 95% RH (non-condensing)
IP Class	IP 50
Battery Life	10+ hours continuous
Range	Up to 400 feet Limited by Phone or Tablet Bluetooth radio strength *Note – As with any radio technology, when you start to add obstructions between the transmitter and the receiver, the ultimate range may decrease as different objects interfere with the radio signal in different ways. The more obstructions you add between the phone and the ManTooth, the weaker the signal may become after it has passed through or around the obstacles. This could ultimately lead to a shorter maximum range. The ManTooth utilizes the highest Bluetooth radio transmitter signal strength available to ensure the best possible range of your ManTooth, however, each situation will be slightly different depending on the environment/ surroundings within you are working.
Bluetooth Radio	Class 1 Bluetooth 2.1 Radio
Max Size	6.5” long x 1.8” wide x 2.5” thick (16.5 x 4.6 x 6.4 cm)
Weight	0.5 lbs (225 grams)
Superheat and Subcool	Automatically calculated by the ManTooth App
Max. and Min. Pressures	Displays and records the maximum and minimum pressures

Refrigerant Database	113 NIST refrigerant profiles included; upgradeable
Share Screenshots and data logs	Screenshot and data log features allow you to save pressure, temperature , and vacuum readings from your sessions which can be automatically organized by location and unit being serviced.
Temperature Sensors	Capable of measuring two temperatures using high accuracy NTC thermistors
System attachment	Very small internal volume minimizes refrigerant loss during system analysis. Standard manifolds and hoses can lose over 50 times more refrigerant with each connection
Pressure Zeroing	Simple single button zeroing at the start of each session
Elevation Compensation	Enter elevation at the start of the session for effortless psia compensation
Battery	Rechargeable Lithium-Ion battery for long battery life and excellent recharging capability for the life of your ManTooth

Frequenty Asked Questions (FAQ's)

Q: How do I utilize the "Vacuum Session" with my ManTooth PT Module (67001/67002/67003)?

A: The ManTooth PT Modules are NOT compatible with the vacuum gauge. To add vacuum capabilities, you will have to purchase a ManTooth-V™ or ManTooth-PTV™ Module. **Note** The 67030 replacement vacuum gauge cannot be used with the 67001/67002/67003 ManTooth PT Modules.

Q: What should I do when I lose the connection to my ManTooth Module during a session?

A: The ManTooth-V™ and ManTooth-PTV™ Modules have a "Self-Healing" feature. If the Bluetooth connection is lost during a session, the app will attempt to re-connect to the ManTooth Module and maintain the session data log. Once the connection is lost, a dialog box will appear on your phone or tablet. If this occurs, move back towards the ManTooth Module(s) until they have reconnected. Once the connection has been re-established, the data logging will resume and the session will continue until it is saved or discarded.

Q: Why am I losing my Bluetooth connection when I am within 400' of the ManTooth Module?

A: With any radio technology, when you start to add obstructions between the transmitter and the receiver, the ultimate range may decrease as different objects interfere with the radio signal in different ways. The more obstructions you add between the phone and the ManTooth, the weaker the signal may become after it has passed through or around the obstacles. This could ultimately lead to a shorter maximum range. The ManTooth utilizes the highest Bluetooth radio transmitter signal strength available to ensure the best possible range of your ManTooth, however, each situation will be slightly different depending on the environment/ surroundings within you are working. Many phones and tablets utilize Class 2 Bluetooth radios, which restrict the range of Bluetooth connections to external devices like the ManTooth.

Q: What happens to my service history if I get a new phone or tablet?

A: The Service History is saved to your phone or tablet within the app data. If you want to use the

ManTooth RSA App on a new device, the Service History will start over on the new device. For this reason, it is recommended to regularly back-up your service history by emailing the data.

Q: What can I do if my ManTooth Module(s) will not attach to the system service ports?

A: The ManTooth Module(s) and corresponding vacuum gauge come with ¼" flare fittings, which are compatible with most systems. However, if you are servicing a system with any other size/style of service port, or if the system service ports do not allow for direct connection of the ManTooth Modules, adapters can be used in conjunction with the ManTooth Module. If there is not enough room around the system service ports to attach the ManTooth Module(s), the YELLOW JACKET 25002 Flex Flow Hose can be utilized. For 5/16" systems, the YELLOW JACKET 19121 (straight) or YELLOW JACKET 19221 (90 Deg) adapters can be used.

Q: Where should I connect the vacuum gauge to the system?

A: When taking vacuum readings of a system, it is recommended to connect the vacuum gauge as far away from the vacuum pump as possible. It is often convenient to connect the vacuum gauge through the side-port of a core removal tool, such as the YELLOW JACKET 18975. If the system only has one accessible service port, the vacuum gauge can also be attached to the ¼ inch male flare port on the ManTooth-PTV™ Module already attached to the system for continuous monitoring of pressure and vacuum level during a system recovery.

Warranty Policy

The YELLOW JACKET ManTooth-V™ and ManTooth-PTV™ Wireless Digital Gauges from Ritchie Engineering Company, Inc. are guaranteed to be free from material and workmanship defects for a period of two years. All other YELLOW JACKET products included in this package are guaranteed to be free from material and workmanship defects for a period of one year. These guarantees do not cover products that have been altered, abused, misused or improperly maintained.

Not all calalogued products are stocked or eligible for return. Please check with your YELLOW JACKET representative or the factory for more information.

All Returns must have an RGA number and proof of purchase/copy of invoice. Please obtain an RGA number from Ritchie Engineering Customer Service by calling 800-769-8370.

All returns must be pre-paid.

YELLOW JACKET®

Ritchie Engineering Co., Inc.