TITANMAX™ User Manual

P/N 40880, 40881, 40885, 40887

NOTE: These Instructions do not cover the manifold attached to the instrument. For instructions on use of the TITAN® 4-Valve Manifold, please visit: https://yellowjacket.com/product/titan-4-valve-test-and-charging-manifold/. The Manifold Instructions are under the Documents tab.

REV A

Contents

Chapter 1:
Before You Start

1.1 Contacting Ritchie Engineering:

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

Corporate Office and Mailing Address:

Ritchie Engineering Co, Inc. / YELLOW JACKET® Products Division
10950 Hampshire Avenue South, Bloomington, MN 55438-2623 U.S.A.
Phone: (952) 943-1300 or (800) 769-8370
Fax: (800) 769-8370
E-mail: custserv@yellowjacket.com Website: www.yellowjacket.com

1.2 Safety Information:

Use the instrument only as specified in this manual. Otherwise, the protection provided by the instrument may be impaired. Refer to safety information in Table 1-1.

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.

Table 1-1. Safety Information

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 User Manual before using the instrument. • Use the instrument only as described in the User Manual, otherwise the protection pro- vided 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 ab- normally. 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: 740 psig (5.10 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 damaged thermocouple or vacuum sensor, could allow an electrical path across the instrument and over wet hoses. 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.

To avoid damage to equipment, follow these guidelines:

- Do not allow pressures beyond the specifications listed in this manual.
- Be aware that internal pressures can change unintentionally when equipment is stored with pressure in the system during temperature changes. If sub-cooled liquid refrigerant is trapped in a hose or manifold with no room for expansion, it may result in dramatic pressure variations with seemingly small temperature changes. Pressures can reach high enough levels to cause damage to the instrument's internal pressure transducers. Release liquid refrigerant from the hoses and manifold when disconnecting from a system.
- Do not attempt to introduce liquid or samples heavily laden with oil into the instrument.
- Do not use this instrument on systems containing leak sealing chemicals. These leak sealants can collect and harden in the instrument, causing permanent damage.

Chapter 2:
Getting Started

2.1 Getting to Know Your TITANMAX™:

Figure 1: TITANMAX™ Front View

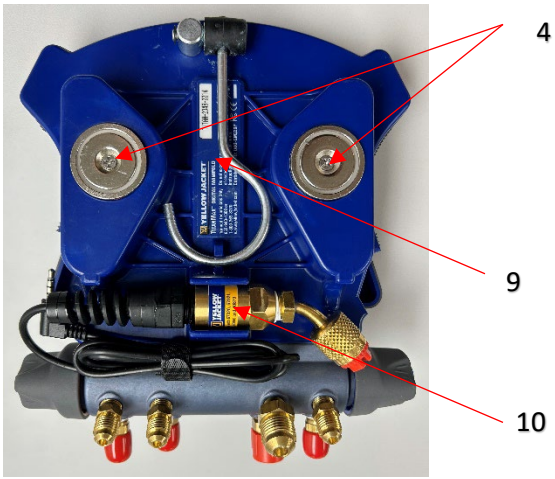


Figure 2: TITANMAX™ Rear View

1. Touchscreen Display
2. Power Button
3. RGB LED
4. Temperature Clamp Mounting Magnets
5. T1 Connector
6. T2 Connector
7. VAC Connector
8. Micro-USB Connector
9. Serial Number/Bluetooth® ID
10. Onboard Vacuum Sensor Mount

2.2 Turning the instrument On and Off:

Press and release the power button, located at bottom center of the display. The main menu will appear on startup.

At any time during operation, press and hold the power button for 3 seconds to turn off the instrument. Note: The first time the device is turned on the Language Selection menu will appear.

2.3 Interacting with the Device:

The TITANMAX™ features a 5" full color resistive touchscreen for improved usability and durability. To interact with the device, use a finger or stylus to touch anywhere on the screen. All interactive buttons are conveniently displayed with the same raised button look as seen in Figures 4 & 5. The only exception is the interaction with the gauge and graphs.

Figure 4: Main Menu Interaction

Resistive touchscreens are resistant to impact and various chemicals, compatible with all types of stylus, and are not susceptible to grease and moisture. While more durable, a resistive touchscreen requires a larger input force to register a touch then other common touchscreen types. Using a fine tipped stylus or fingernail can greatly improve interaction with the device.

Figure 5: Device Settings Interaction

2.4 Connecting and Using the Temperature Clamps:

Two (40846) TITAN® Temperature Clamps, pictured in Figure 6, are supplied with the TITANMAX™ and can be used to monitor system temperature, and used in calculating superheat and subcooling. To connect the sensors to the device, plug the male temperature clamp connectors into either the T1 (Left) connector or T2 (Right) connector (shown in Figure 7 below). Attach the clamps to the point on the system where it is desired to measure temperature. Ensure that both jaws of the clamp are well secured and the metal temperature probe on the upper jaw is flush with the surface to be measured.

Figure 6: P/N 40846 Included TITAN® Temperature Clamps

When not in use, the temperature clamps can be conveniently stored by attaching the clamps to the two magnets located on the back of the device (shown in Figure 8).

Figure 7: Connecting the Temp Probes

Figure 8: TITAN® Temperature clamp storage

2.5 Connecting and Using the Vacuum Sensor:

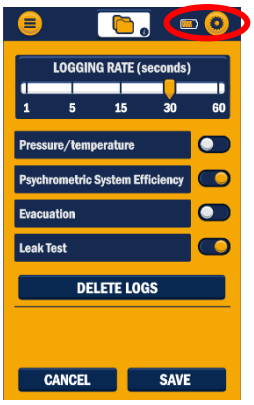
The TITANMAX™ includes a (67044) YELLOW JACKET® Vacuum Sensor, pictured in Figure 9, which can be used with this unit to measure the current depth of vacuum within a system. To connect the vacuum probe to the device use the VAC connector as shown in Figure 10. Connect the vacuum probe to a system during evacuation to monitor the system pump down. Ensure that the vacuum probe is tight to the system and at a significant distance from the vacuum pump such that it does not disturb the vacuum measurements.

Figure 9: P/N 67044 Vacuum Sensor

Figure 10: Connecting the Vacuum Sensor

2.6 Interpreting the Battery Life Indicator:

This instrument utilizes a 3,350 Ahr rechargeable lithium-ion battery. It is equipped with a battery level indicator displayed in the top right of all screens (shown in Figure 11). At full charge, the LED will appear solid green. As the charge is drained, the bar will decrease in width. When the battery life indicator turns red, the device charge is at 10% or less and needs to be plugged into a power source immediately.



This device is rated for 4.5 hours of battery life with full backlight brightness and 80 hours with no backlight. To properly maximize battery life, make use of both AUTO OFF and BACKLIGHT TIMER features accessible in the device settings menu (see pages 20). The most influencing factor on battery life is the backlight intensity, be sure to adjust the backlight level accordingly depending on your current viewing conditions.

Figure 11: Battery Life Indicator

2.7 Charging the Battery:

To ensure maximum battery life, make sure the TITANMAX™ is charged before and after each job session. To charge the device, connect the manifold TITANMAX™ to a power source via the provided data transfer cable as pictured in Figure 12. When connected to a power source, the LED will turn a solid green. It takes approximately 3 – 3.5 hours to reach full charge from dead battery. Once the device has reached full charge, the green LED will shut off indicating the charge is complete.

Figure 12: Charging the Battery

2.8 Operating the Backlight:

This instrument is equipped with an adjustable backlight and backlight auto dimming capabilities. When the backlight dims during use, a touch anywhere on the screen or a quick press of the power button can be used to wake up the device and power the backlight on.

Figure 13: Backlight Settings

To help conserve battery life, make sure to use the backlight timer feature in device settings (Figure 13). This feature allows the user to set intervals for how long the backlight should remain on after the last user input. The backlight timer can be adjusted from 5 seconds to 15 min. See page 21 for instructions on adjusting the backlight level and timer.

2.9 Datalogging:

The TITANMAX™ digital manifold can be used to gather and record live system readings for later analysis. From the moment the device enters a specified session, it begins to record all current session data inputs when that session is set to on for logging. The logging rate can be adjusted anytime through the LOGS settings menu (see Page 22).

After completing a job, the data log files can be accessed by connecting the instrument to a PC. To connect the TITANMAX™ to a PC, connect the provided data transfer cable to the micro-USB port on the upper right side of device shown in Figures 14 and 15. Plug the opposite end into the USB port on a PC. Power on the TITANMAX™, the PC will attempt to open the device as a flash drive as shown in Figure 15.

Figure 14: Micro-USB Location

Figure 15: Connecting to the Micro-USB

Data log files are stored as .csv files and are named with the following convention: Last 5 digits of the TITANMAX serial number, followed by a 3 digit sequential number 000 - 999.csv. See Figure 16 for example of stored data log files.

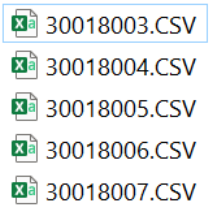


Figure 16: TITANMAX™ as Removeable Drive

Ex. 5th week of 2024 with device serial number ending in 127, 4th data log file; 405127AA.

These files cannot be modified while stored on the device but can be copied from the drive to the PC and modified using any application compatible with .csv files (Microsoft Excel, notepad, etc.).

If the device reaches max storage and has not been cleared, it will cease to log data until files have been cleared from the device. Be sure to select the proper logging rate based on the intended length of the data log session. The TITANMAX™ has limited internal memory, exceeding maximum memory capacity will result in loss of data. Table 2-1 details the maximum logging duration for several logging rates assuming the internal memory has just been cleared, or is 0% capacity.

Selected Sampling Rate (s)	Estimated Datalog Length (hrs)
1s	13.5
5s	67.5
10s	135
30s	405
60s (1 min)	810

Table 2-1: Sampling Rates and Time to Maximum Memory Capacity

2.10 Interpreting the RGB LED:

The LED on the front face of the device can display a variety of colors during normal operation. Below is a list of various colors and flashing schemes encountered during normal use.

- Flashing Blue: The TITANMAX™ flashes blue every time it stores a data log sample. If the logging rate is set to a larger time increment, the LED will not flash blue as often.

- Flashing Red: When the device reaches low charge, or falls below 10% battery charge, the LED will flash red every time a data log sample is taken (at the same rate as flashing blue).

- Solid Blue: The LED will turn a solid blue when the power button is pressed and held when powering on. An extended hold of the on button will put it in a bootloader mode, cycle power button again to shut off unit.

- Solid Green: The LED will remain a solid green color when connected to a power source and charging. When the device reaches full charge, the solid green light will shut off regardless of if it remains connected to a power source.

- Solid Violet: If the instrument is placed into updater mode, the LED will turn a solid violet color and the display will shut off (if the device is powered on). This mode is not intended for normal use; to exit updater mode, hold the power button for 3 seconds or until the LED powers off.

Chapter 3:
Operation Menus

3.0 Main Menu

Once the Language has been selected, the TITANMAX™ will always start up on the Main Menu shown in Figure 17 below. Tap any of the six buttons labeled “Available Devices, Pressure/Temperature, Evacuation, Leak Test, Psychrometric , or Information”. The Available Devices button allows user to select YJACK® Bluetooth® devices (Temp Clamps, Vacuum Gauge, and Psychrometer). The settings menu can be accessed by tapping the gear icon in the upper right-hand corner.

Figure 17: Main Menu

3.1 Pressure/Temperature Menu

3.1.1 Overview:

The TITANMAX™ Pressure/Temperature mode can be used to accurately diagnose and service any system with compatible refrigerant. The Pressure/Temperature session features high and low side pressure gauges that can be displayed in: Analog, digital, or graphical format. This session can be used to monitor system high and low side pressure, high and low system temperatures, vapor saturation and liquid saturation temperatures, and calculated system superheat and subcooling values.

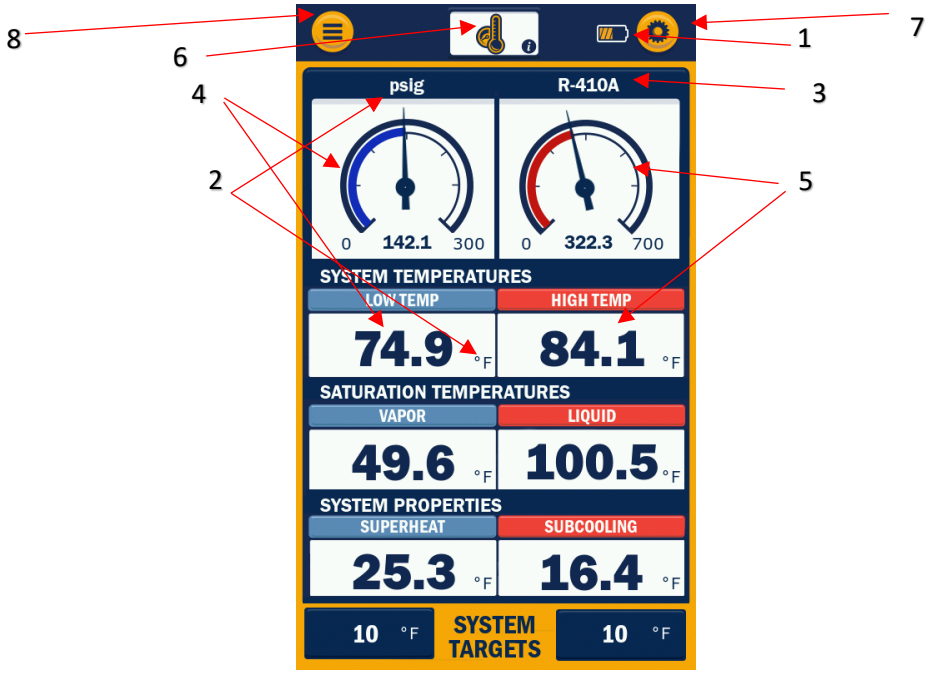


Figure 18: Pressure/Temperature Mode Diagram

1. Battery Level Indicator
2. Currently Selected Pressure & Temperature Units
3. Currently Selected System Refrigerant – Refrigerant Settings Shortcut
4. Low Side Pressure & Temperature Measurement
5. High Side Pressure & Temperature Measurement
6. Current Menu Selection Display & Information Button
7. General Settings Button
8. Main Menu Button

3.1.1 Interpreting the Pressure Analog Gauges:

Pressure features a set of fully functional digital analog pressure gauges. Each gauge operates on a linear scale with major divisions by lines. When adjusting the selected pressure unit, the gauge face will update accordingly to reflect that unit of measure. High and low side pressure is displayed in a digital format at the center of each blue and red analog gauge respectively. Each gauge needle adjusts in real time and can be used to observe fluctuations in pressure as if utilizing a real analog gauge. All temperature readings are conveniently displayed below each gauge as saturation temperature, system temperature, superheat and subcooling.

3.1.2 Interpreting the Pressure Line Graphs:

Each digital analog gauge can be transformed into a line graph (shown in Figure 19) by tapping anywhere within the center of the gauge. While in graph mode, system pressure is plotted on a linear scale. The pressure graphs utilize a leader line to plot new data from left to right. Old data is conveniently displayed to the right of the leader line such that it can be compared to newer data as it is recorded. Any old data will be replaced by newer data as the leader line advances to the right, each graph completely overwrites every 300 seconds (approx. 5 minutes).

System temperatures, saturation temperatures and calculated superheat and subcool are displayed in a table format below the set of graphs. Each graph can be transformed back into a gauge or number at any time by tapping anywhere within the graph and selecting gauge and save.

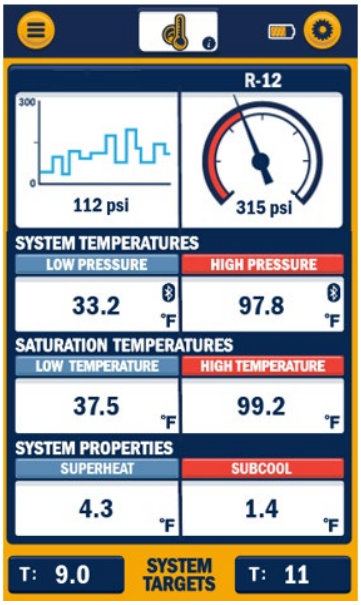


Figure 19: Pressure/Temperature Line Graphs

While on any menu screen, tap the settings icon in the upper right-hand corner to access the general settings menu. Finally, the main menu can be accessed by tapping the menu button at the top left of the display.

NOTE: Before connecting to the system, make sure to zero the pressure transducers at ambient pressure to ensure accurate pressure readings. To read about the transducer zeroing process, see page20.

3.2 Evacuation Menu

3.2.0 Overview:

Once the refrigerant has been recovered from the system, the TITANMAX™ can be used to accurately monitor the system evacuation. Evacuation menu displays the current vacuum pressure in digital and graphical form, target vacuum level, and the vacuum hold timer.

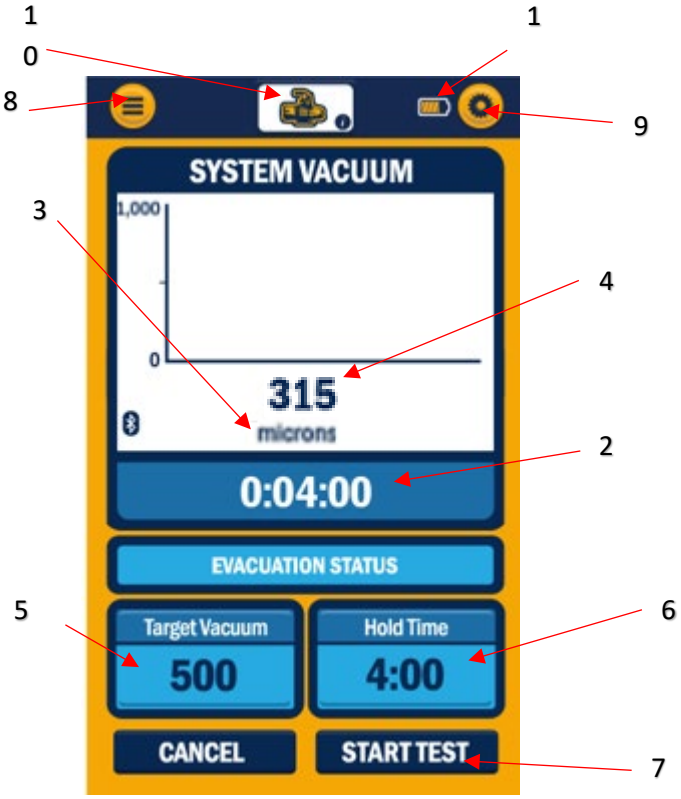


Figure 20: Evacuation Menu Diagram

1. Battery Level Indicator
2. Session Timer
3. Currently Selected Vacuum Unit – Unit Settings Menu Shortcut
4. System Vacuum Pressure
5. Target Vacuum Level Button
6. Vacuum Hold Time Button
7. Start Vacuum Test Button
8. Menu Button
9. General Settings Button
10. Current Menu Selection Display & Information Button

System vacuum pressure is displayed in real time as a numeric representation and as represented in a graphical format as a line graph. While evacuating the system, the

TITANMAX™ will display microns numerically from atmosphere down to the 1,000 micron vacuum level after which it will accurately measure and display down to 5 microns numerically and on the line graph.

3.2.1 Interpreting the Evacuation Graph:

The evacuation menu features a fully functional evacuation line graph like those in Pressure/Temperature menu. The evacuation graph starts showing graphing on the y-axis once the current vacuum reading falls below 1000 microns. The evacuation numerical reading reads from atmospheric all the way into a deep vacuum but the graph shows data trending once the 1000 micron level has been reached. A leader line is used to plot new data from left to right. This function allows the user to compare old data to newer data as each measurement is recorded and displayed. The line graph fully overwrites the old data every 300 seconds (approx. 5 minutes) and will begin again from the left side of the graph.

3.2.2 Operating the Evacuation Menu:

Before beginning an evacuation, connect the YELLOW JACKET® Vacuum Sensor (67044) to the VAC connector on the right side of the device VAC port. Connect the vacuum probe to the system at a sufficient distance from the vacuum pump such that it will not disturb the vacuum reading. Use the “Target” and “Hold” buttons to set the target vacuum level and vacuum hold timer respectively. Pressing each of these buttons will bring up a keypad to type in numbers between a range of available values, with the last value selected being automatically saved. Target vacuum level can be adjusted in whole integer increments. Vacuum hold timer can be adjusted in integer increments between 1 and 30 minutes.

The user will start a pressure hold test by tapping the button “HOLD TEST” the user will be taken to the pressure rise setup screen If the “CANCEL” button is pressed, the user will remain on the evacuation screen.

NOTE: Using the vacuum hold timer can help to ensure that all refrigerant has been evacuated from the system and the system is free of non-condensables. Refrigerant and non-condensables can cause the vacuum level to rise in a system giving a false positive during a leak test when no leak is present.

3.3 Pressure Hold Mode – Pressure Decay Test

3.3.0 Overview:

The TITANMAX™ can be used to monitor a system leak through a drop in positive pressure. The pressure decay test displays the current system pressure (Current), the initial pressure (Start), the change in pressure (pressure drop), the Limit Pressure (Allowable), and the Rate of Change (change/min).

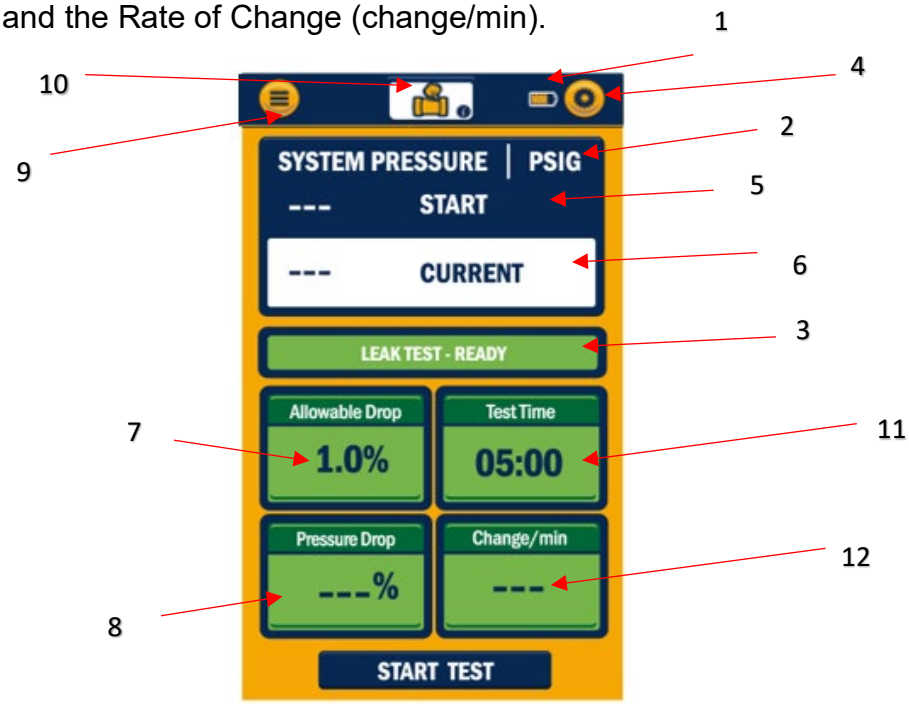


Figure 21: Pressure Hold – Pressure Decay Test Diagram

1. Battery Indicator
2. Currently Selected Units
3. Leak Test Status
4. Settings Menu Shortcut
5. Initial Pressure
6. Current System Pressure
7. Pressure drop Limit
8. Actual Pressure drop
9. Settings Button
10. Currently Selected Menu
11. Leak Test Timer
12. From Starting Pressure, change/ min

Live system pressure is measured and compared to initial pressure readings to determine if the system has lost pressure over time. Current system pressure is displayed as a line graph, and in a digital format displayed as a stacked display.

3.3.1 Interpreting the Pressure Decay Graph:

Pressure Decay menu features a line graph which plots current system pressure readings in real time. System pressure is plotted on a linear scale. The current system pressure graph utilizes a leader line to plot new data from left to right. Old data is conveniently displayed to the right of the leader line such that it can be compared to newer data. Any old data will be replaced by newer data as the leader line advances to the right, the line graph will completely overwrite every 300 seconds (approx. 5 minutes).

The line graph starts on the first pressure measurement recorded when beginning a new plot. This value is displayed adjacent to the plot line to the left of the graphon the top left. A scaling value is displayed based on allowable leak. The scaling value sets the lower bound of the graph based on the current value.

Ex. First Reading = 163.3 psig
Scaling Value = 20 psi
Upper Boundary = 163.3 psig
Lower Boundary = 163.3 psig – 20 psi = 143.3 psig

3.3.2 Operating the Pressure Decay Mode:

To conduct a pressure decay test, select “LEAK TEST” from the main menu, the device will advance to the pressure hold test setup menu seen in Figure 22. This menu allows the user to adjust the allowable change in pressure and pressure decay test duration.

Allowable change is measured as a percent of the initial system pressure the system can drop before the TITANMAX™ deems the pressure decay test a failure. To adjust the allowable change percent, enter the value desired as the percent change. The test duration sets the length of time the pressure decay test will be conducted. If the pressure has not dropped below the limit pressure within the test duration, the TITANMAX™ deems the pressure decay test a pass. Press the TEST TIME button to enter the test duration value. When all desired settings have been set, select the START TEST button to advance to the pressure decay test. The CANCEL TEST button can be used to return to the LEAK TEST menu.

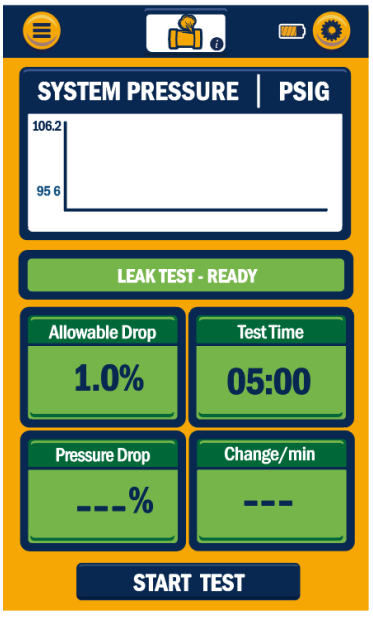


Figure 22: Pressure Decay Test Setup Menu

Ensure the system is properly charged to the desired test pressure and is connected to the manifold low side transducer. Once the system is ready for the pressure decay test, tap the ALLOWABLE DROP button to set allowable pressure change

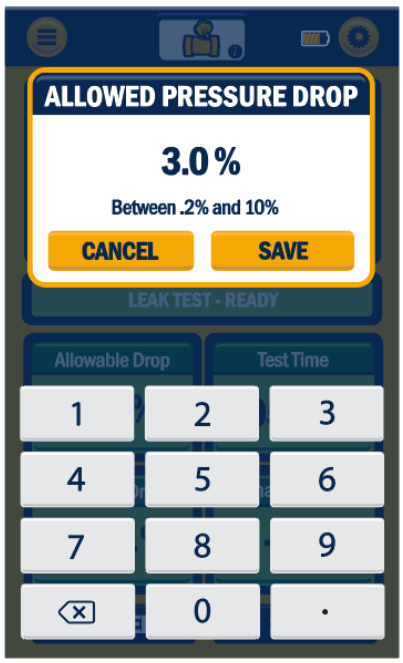


Figure 23: Pressure Decay Test – Set %

during the test (shown in Figure 23). The current system pressure will be stored as START.

During the pressure decay test, CURRENT will adjust as the current system pressure changes. Pressure Drop will adjust to reflect the change between the initial system pressure and current system pressure. System pressure dropping below this value within the time limit as set by the test duration will trigger a failure.
If the system pressure falls below the limit pressure within the test time limits, the TITANMAX™ will display a “FAIL” notice (Figure 24) and the test is complete. If the pressure decay test ends before the system pressure falls below the limit pressure, the device will display a “PASS” notice indicating the test is complete (Figure 25).

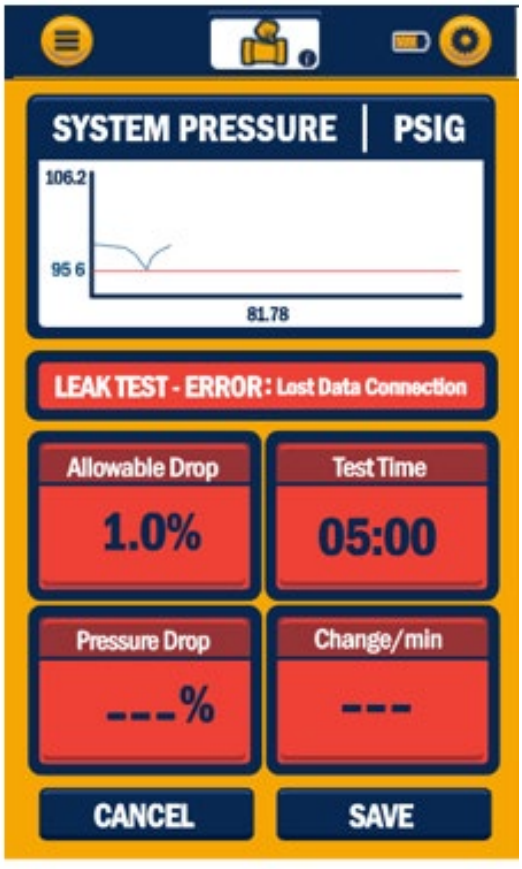


Figure 24: Pressure Decay Test - FAIL

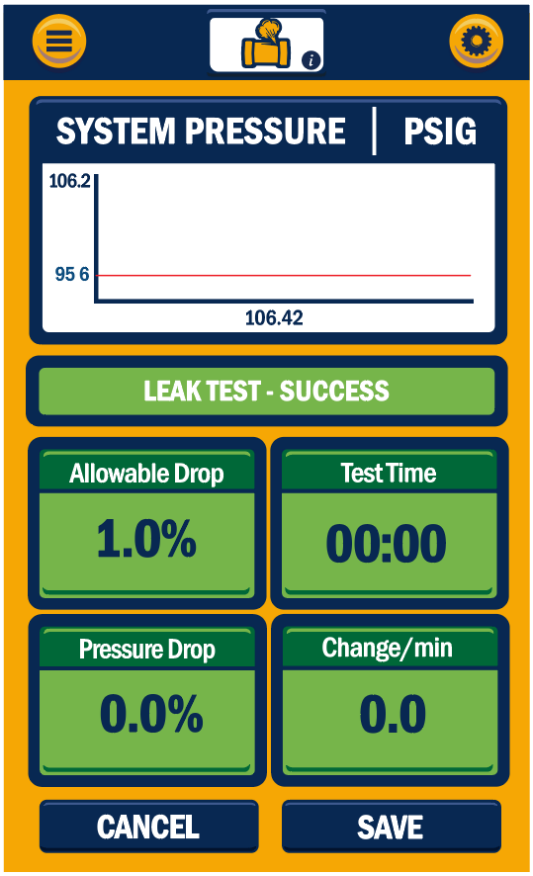


Figure 25: Pressure Decay Test - PASS

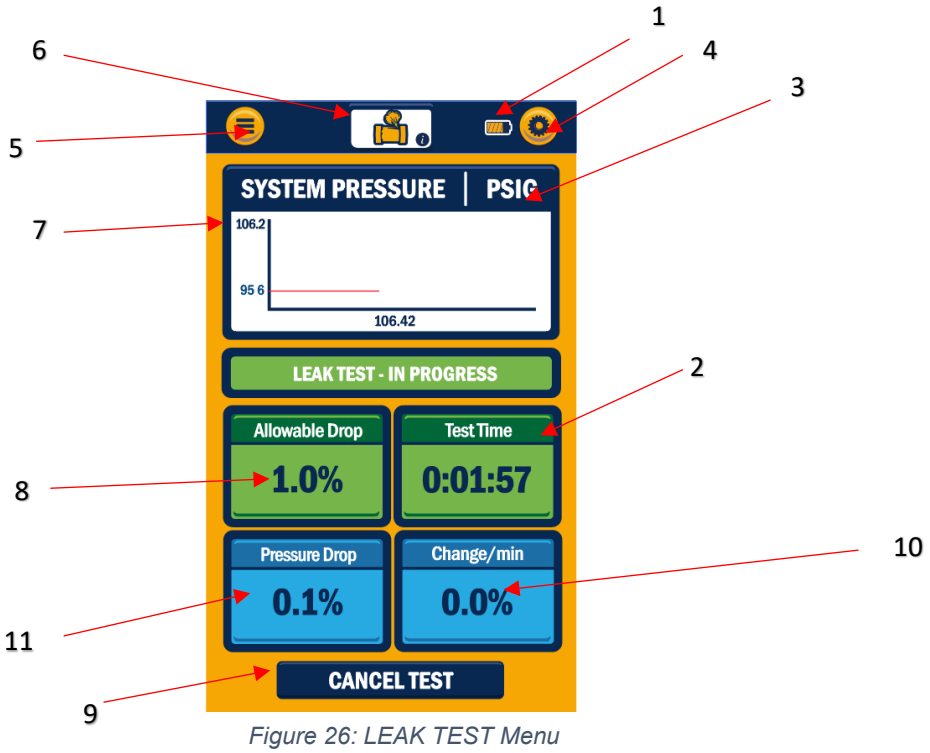


Figure 26: LEAK TEST Menu

1. Battery Life Indicator
2. Session Timer
3. Currently Selected Vacuum Units – Unit Settings Menu Shortcut
4. Settings Button
5. Main Menu Button
6. Currently Selected Menu
7. Initial Pressure
8. Pressure Limit
9. Start/ Cancel Test Button
10. Percent Change Per Minute
11. Current System Pressure change

Live system pressure is measured and compared to initial pressure readings to determine if the system has loss pressure over time. Current system pressure is displayed as a line graph, and in a digital format displayed at the left of the line graph.

Interpreting the Pressure Leak Graph:

The pressure leak test features the same line graph as evacuation mode. The pressure leak graph plots in real time and features an allowable reading y-axis. A leader line is used to plot new data from left to right. This function allows the user to compare old data to newer data as each measurement is plotted. The line graph fully overwrites the old data every 300 seconds (approx. 5 minutes) and will begin again from the left side of the graph.

3.4 Psychometric Menu

3.4.0: Overview:

The Psychometric session (Figure 27) displays: Relative humidity, dry bulb temperature, wet bulb temperature, and dew point temperature from 2 YJACK DEW® psychrometric probes, that measure relative humidity in supply air and return air in HVAC systems. The first time the Psychometric session is started, the supply and return air measurements will need to be assigned to the specific YJACK DEW® probes being used in the Available Devices screen.

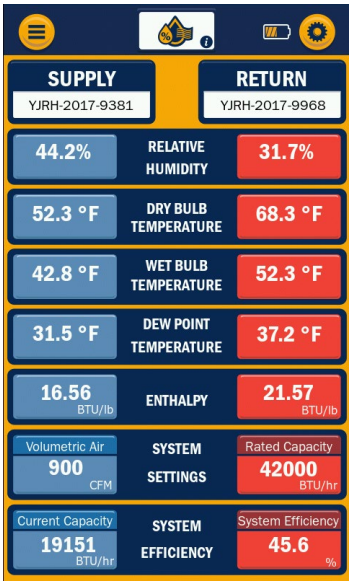


Figure 27: Psychrometric Menu

Once the YJACK DEW® probes have been assigned, the following readings are display:

Relative Humidity, Dry Bulb Temperature, Wet Bulb Temperature, and Dew Point Temperature.

The System Settings can be entered by touching the boxes for Volumetric Air (figure 28) and Rated Capacity (Figure 29).

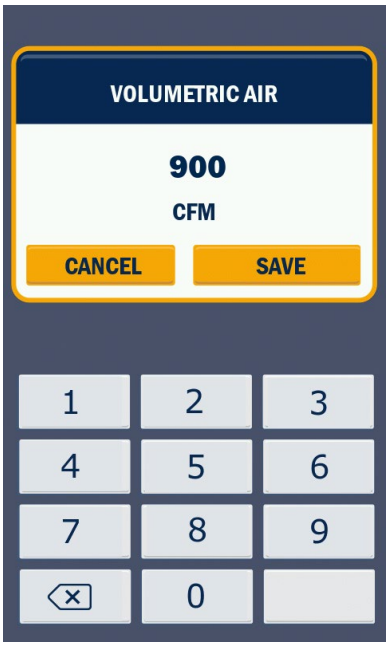


Figure 28: Volumetric Air Input screen

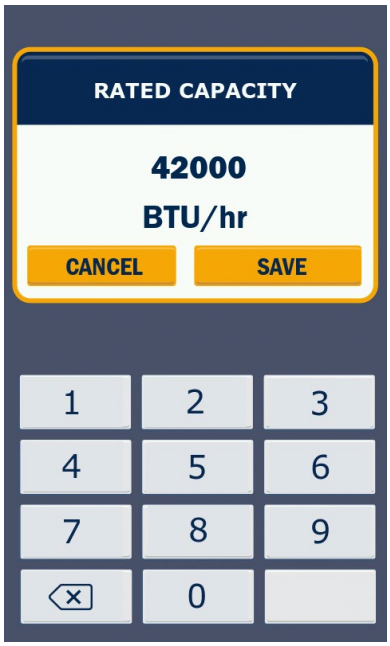


Figure 29: Rated Capacity Input Screen

Once the System Settings have been entered the calculated Current Capacity and System Efficiency % will be displayed.

Chapter 4:
Settings

Settings Menus Overview

The TITANMAX™ settings menus are separated into five menus: refrigerant settings, unit settings, zero the on board pressure sensors, device settings, and data logging. While on any modes screen or the modes menu, the general settings menu can be quickly accessed by tapping the gear icon in the top right corner.

4.0 General Settings Menu

The general settings menu, shown in Figure 30, allows the user to adjust system refrigerant, enter the units and device settings menus, zero the pressure transducers, and adjust visibility and sleep settings on the touchscreen display. To access the refrigerants, the units, or device settings menus, tap on the appropriate button. The cancel button in the bottom left corner can be used to return to the previous screen at any time.

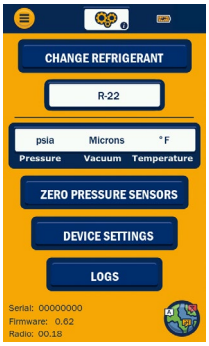


Figure 30: General Settings Menu

4.1 Refrigerant Settings Menu

The refrigerant settings menu, shown in Figure 31, can be accessed by tapping on the "Change Refrigerant" button in the general settings menu. To change currently selected refrigerant, tap the page up or down icons to the page containing the desired refrigerant. Tap the star next to the new refrigerant selection to make it a favorite. You are allowed the ability to select 3 favorites into the favorite section. Tap the blue circle to the right of the desired refrigerant turning it white and tap save and the device will automatically return to the previous screen with the new selection saved as the current refrigerant. The currently selected refrigerant is always displayed in the box under change refrigerant in the settings menu. To exit the refrigerant menu without saving a new selection tap the Main Menu button and select "Discard Changes" in the Exit popup window see figure 32.

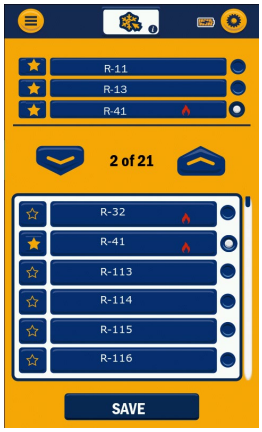


Figure 31: Refrigerant Settings Menu

Figure 32: Discard Refrigerant Change Menu

4.2 Unit Settings Menu

The unit settings menu, shown in Figure 33, can be used to quickly change currently selected units. This menu can be accessed by tapping the units in the general settings menu to select a new pressure, vacuum, temperature, power or flow rate unit, tap the desired unit within the corresponding list. Once the desired units have been selected, tap the save button in the lower right corner to save new selections.

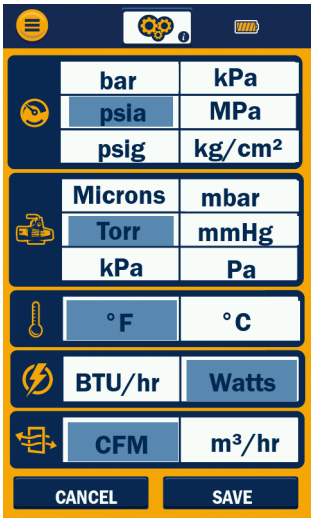


Figure 33: Unit Settings Menu

4.2.1 Pressure Units:

Pressure units are used to display pressure measurements while in pressure/temperature and pressure decay mode. This unit can be adjusted to one of six pressure units: psig, psia, bar, kg/cm^2, MPa, and kPa.

4.2.2 Vacuum Units:

Vacuum units are used to display vacuum measurements while in evacuation mode. This unit can be adjusted to one of six vacuum units: Microns, Pa, kPa, mmHg, Torr and mBar.

4.2.3 Temperature Units:

Temperature units are used to display temperature measurements while in pressure/temperature session. This unit can be adjusted to one of two temperature units: °F and °C.

4.2.4 Power Units:

Power unit options are: BTU/hr and Watts.

4.2.5 Fow Rate:

Flow rate unit options are: CFM and m3/hr

4.3 Zeroing the Pressure Transducers

To ensure accurate pressure readings, the pressure transducers should be re-zeroed before every job. To correctly zero the pressure transducers, first remove any pressure from the manifold and ensure all knobs are open such that the manifold is at current atmospheric pressure. Next, navigate to the general settings menu and tap the “Zero Pressure Sensors” button.

If the zeroing was successful, the button will flash green. If the zeroing was unsuccessful the button will flash red. A common issue when zeroing transducers is residual positive pressure within the manifold. The TITANMAX™ will not zero transducers if the manifold contains pressure exceeding 30 psia.

4.4 Device Settings Menu

The device settings menu, shown in Figure 34, can be used to adjust a variety of device settings including display brightness, backlight timer, and auto off timer. To access the device settings menu, tap the “Device Settings” button in the general settings menu. To adjust the display brightness, tap and drag the slider bar below brightness until the desired brightness is displayed. To adjust the backlight timer, or auto off timer, tap the + and – buttons until the desired time is displayed. Tap the save button in the lower right corner to save new device settings and return to the general settings menu.

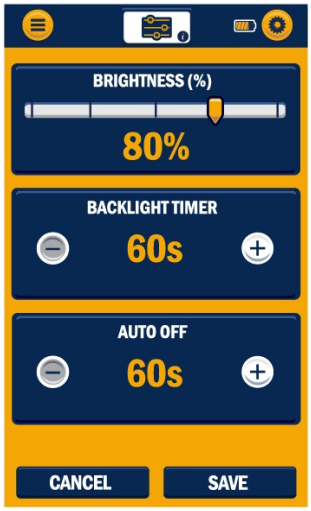


Figure 34: Device Settings Menu

4.4.1 Brightness:

Brightness can be used to adjust the intensity of the LCD backlight in a range of values from 6 to 100%. Increasing the backlight intensity may help viewability in different lighting but will also decrease the battery life.

4.4.2 Backlight Timer:

The backlight timer sets the duration of the backlight since last user input. If the backlight timer is set to a higher value, the backlight will remain on for a longer period but at the cost of decreased battery life. After the backlight turns off, it can be toggled on at any time with a quick press of the power button or a tap of the touch screen. The backlight timer can be adjusted in eight increments: 5s, 15s, 30s, 45s, 60s, 5m, 10m and 15m.

4.4.3 Auto Off:

The auto off timer will automatically power the unit down if there has been no user input for the selected duration of time. This feature can be used to significantly increase the battery life of the manifold. The Auto Off Timer can be set to four increments: 15m, 30m, 1hr and None. Selecting None will prevent the unit from auto powering off.

NOTE: If attempting to capture data logs for an extended period, ensure that the Auto off timer is set to none. If the auto off timer is not set to none, the device will power off after the set time interval and any additional datalogging information will be lost.

4.5 LOGS Menu

The Logs menu, shown in Figure 35, can be used to change Sessions to record. This menu can be accessed by tapping the LOGS button in the general settings menu to select a rate, tap the desired interval within the logging rate bar. Once the desired interval has been selected, tap the save button in the lower right corner to save new selections.

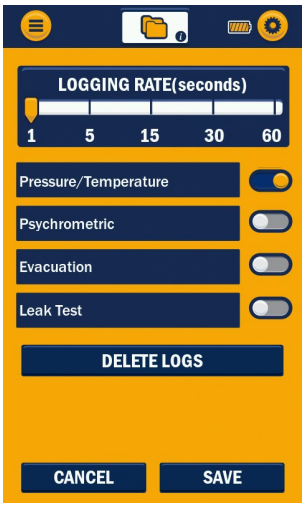


Figure 35: Logs Menu

4.5.1 Logging Rate:

Logging rate sets the time interval for how often a data sample is stored. It may be tempting to set the logging rate to the lowest possible time interval (1s) but this may result in extremely large datalog files making it difficult to analyze the information. Be sure to set the logging rate to an appropriate interval for the conditions being tested. The logging rate can be set to five different time intervals: 1s, 5s, 15s, 30s, and 1m.

Be sure to select the proper logging rate based on the intended length of the datalog session. As the TITANMAX™ has limited internal memory, exceeding maximum memory capacity will result in loss of data. To avoid this, ensure to select the appropriate logging rate for your current datalog session. Table 4-1, details the maximum logging duration for several logging rates assuming the internal memory has just been cleared, or is 0% capacity.

Selected Sampling Rate (s)	Estimated Datalog Length (hrs)
1s	13.5
5s	67.5
10s	135
30s	405
60s (1 min)	810

Table 4-1: Sampling Rates and Time to Maximum Memory Capacity

Chapter 5:
YJACK VIEW® App Integration

5.0 Overview:

The TITANMAX™ features a Bluetooth® low energy radio and is fully compatible with both the iOS and Android YJACK VIEW® Apps V5.1 or later. The YJACK VIEW® app in conjunction with the TITANMAX™ can be used to remotely monitor system pressure, temperature, vacuum, and perform target superheat and subcool calculations. Additionally, the YJACK VIEW® app can generate its own datalog files and job reports.

5.1 Operation of the YJACK VIEW® App with the TITANMAX™:

Before the TITANMAX™ can be used with the YJACK VIEW® App, the YJACK VIEW® App must be installed and updated to newest version on the desired mobile device.

Navigate to the YJACK VIEW® App and make sure the manifold is powered on. The TITANMAX™ should appear in the available devices menu as the name of the device followed by the serial number (Ex. TITAN-2402-0029) as seen in Figure 36. Select the appropriate device in the applicable session and the on screen data will appear in the App.

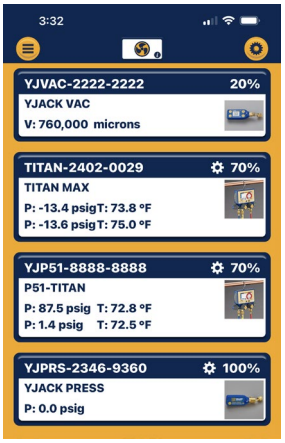


Figure 36: Pairing a TITANMAX™

The TITANMAX™ will be available to connect through the YJACK VIEW® App if the device is powered on and the YJACK VIEW® App is updated.

NOTE: These Instructions do not cover operating the YJACK VIEW® App, selecting or adjusting settings, retrieving datalog files, generating job reports, and all other features of the YJACK VIEW® App. For instructions on use of the YJACK VIEW® app, please visit: https://yellowjacket.com/product/titanmax-digital-manifold/.
The YJACK® manual instructions are under the Documents tab.

When the TITANMAX™ is connected to a mobile device via Bluetooth®, the LED will flash blue every second.

Chapter 6:
Maintenance

6.0 Overview:
Basic operator maintenance is covered in this chapter. For more extensive maintenance and for repair, contact Ritchie Customer Service. See Chapter 1 for contact information.

6.1 General Maintenance:
Since this instrument may be used in the presence of a wide range of chemical liquids and vapors, it is recommended that the case be cleaned often with a damp cloth and mild detergent such as dish soap.

Although the resistive display is tough and suitable for typical industrial use, take care when cleaning the display as clarity is a critical component of this instrument:

- Normally, the display can be cleaned as one would clean plastic eyeglass lenses: Use a soft, 100% cotton or microfiber cloth and water or eyeglass lens cleaning solution. Do not use paper products.
- If the display is very dirty, generously soak a soft cloth with warm, soapy (dish soap) water and place the cloth for a couple of minutes over the display to loosen any stubborn dirt. Wipe off excess water with a clean, less dampened, 100% cotton or microfiber cloth, and complete the cleaning using the normal display cleaning method described above.
- DO NOT place the device under running water, always use a dampened cloth to transport liquid to and from the device.

6.3 Replacement Parts/Optional Accessories: See Table 6-1 for replacement part numbers.

Table 6-1: ***Replacement Parts***

UPC#	Description
67044	Vacuum Sensor
67066	YJACK VAC® Vacuum Gauge
40846	TITAN® Temperature Clamp
67061	YJACK® Temperature Clamp
40847	Micro-USB Cable for TITANMAX™
40845	Replacement Backpack
18160	60” Yellow 3/8” Straight x 3/8” 45° PLUS II™ “B”
21985	60” 3-PAK RYB Standard Fitting PLUS II™ 1/4” Hose
29985	60” 3-PAK RYB Compact Ball Valve PLUS II™ 1/4” Hose
29425	60” Blue, Compact Ball Valve (1/4” x 5/16”)
29465	60” Red, Compact Ball Valve (1/4” x 5/16”)

6.4 Software Updates:

Details related to software updates are available online at www.yellowjacket.com or by contacting Ritchie Engineering. See Chapter 1 for contact information.

Chapter 7:
Device Specifications

Table 7-1: *Physical Specifications*	
Maximum Pressure	740 psia (51.0 bar)
Operating Temperature	140 to -4°F (60 to -20°C)
Storage Temperature	140 to -4°F (60 to -20°C)
Battery Life	4.5 hrs Continuous Backlight
	80 hrs No Backlight
Size	Approx. 9.0" x 8.5" x 4.0"
Weight	3 lbs

Table 7-2: *Instrument Specifications*	
Working Pressure	0 – 740 psia (51.0 bar)
Pressure Sensing Resolution	0.1 psi, 0.1 bar, 1 kPa
	0.001 MPa, 0.01 kg/cm^2
Pressure Sensing Accuracy	0.5% of Full Scale at 77°F (25°C)
	1% of Full Scale 55 to 130°F (13 to 54°C)
	2% of Full Scale -40°F to 248°F (-40 to 120°C)
Temperature Sensing Range	Sensing Element: -40 to 266°F (-40 to 130°C)
	Maximum Cord Temp: 176°F (80°C)
	Maximum Clamp Temp: 203°F (95°C)
Temperature Sensing Resolution	0.1°F or °C
Temperature Sensing Accuracy	±0.36°F (±0.2°C)
Vacuum Sensing Range	5 to 100,000 microns
Vacuum Sensing Resolution	1 micron

Chapter 8:
Troubleshooting Guide

TABLE 8-1 TITANMAX™ Troubleshooting		
Problem	**Possible Cause(s)**	**Possible Solution(s)**
Screen does not display anything	Power saving backlight timer has expired due to inactivity	Check backlight timer setting
		Tap power button or anywhere on display to power on backlight
	Device is not powering on	Make sure manifold is sufficiently charged
	Screen is damaged	Contact technical support
Screen has dimmed	Backlight brightness setting is low	Check backlight brightness setting
	Screen is damaged	Contact technical support
Screen not responding to touch	Display is damaged	Contact technical support
	Device is connected to PC	Disconnect from PC
Device not responding to button press	Button damaged	Contact technical support
	Device is connected to PC	Disconnect from PC
Pressure Transducers won't zero	Manifold is under pressure	Make sure manifold is vented to atmosphere
	Pressure transducers damaged	Contact technical support
Temperature reading incorrect/not displaying	Temperature clamp barrel connector not fully seated	Check temperature clamp connection to manifold
	Temperature clamp/cable damaged	Call technical support
	Temperature clamp jack damaged	Call technical support
	Clamp not properly attached to system	Check clamp connections to system
	Low-Side and High-Side readings reversed	Make sure T1 is attached to system low-side, T2 to system high-side

Problem	Possible Cause(s)	Possible Solution(s)
Vacuum reading incorrect/not displaying	Vacuum probe barrel connector not fully seated	Check vacuum probe connection to manifold
	Vacuum probe/cable damaged	Call technical support
	Vacuum probe jacks damaged	Call technical support
	Probe not properly attached to system	Check vacuum probe connection to system
	Vacuum probe plugged into wrong jack	Make sure vacuum probe is plugged into vacuum port
Pressure readings incorrect	Pressure transducers not zeroed properly	Make sure pressure transducers are zeroed before use
	Pressure transducers damaged	Call technical support
Manifold not holding pressure/vacuum	Knobs are open	Check position of knobs
	Manifold damaged/leaking	Call technical support
	Hose connections not tightened properly	Check hose connections
Device not recognized when connected to PC	USB cable not connected within 10 seconds of power-up	Connect USB before power-up or power cycle the manifold
	USB cable not connected properly	Check USB connection between manifold and PC
	Device not powered on	Power on manifold for data transfer
	USB cable damaged	Use alternate USB cable
	Manifold damaged	Call technical support
Unable to save new data logs	Device memory full	Upload existing datalogs and clear logs from manifold memory (see settings menu)
	Manifold damaged	Call technical support

Problem	Possible Cause(s)	Possible Solution(s)
Manifold not charging, LED not solid green	USB cable not connected properly	Check USB connection to manifold and power source
	USB cable damaged	Use alternate USB cable
	Device fully charged	No action
	Manifold damaged	Call technical support
Unable to receive Bluetooth data	Device is not powered on	Make sure manifold is powered on
	Bluetooth not enabled on mobile device	Enable Bluetooth® on the mobile device
	YJACK VIEW® App old version	YJACK VIEW® app must be version 5.0 or newer
	Manifold not within range of mobile device	Ensure manifold and mobile device are within range or add a YJACK PATH® range extender
Bluetooth data stops	Manifold has been powered off	Adjust auto-off timer setting
		Make sure manifold is sufficiently charged
	Mobile device has moved out of range	Move mobile device back into range of manifold or add a YJACK PATH® range extender
LED is flashing red and device is powering off immediately	Battery charge is critically low	Charge manifold battery
LED is solid purple and screen does not display anything	User has entered updater mode	Tap the button to power off. Wait a few seconds and turn back on.