



SkyTank ST100 “Powered By SmartTank” Wireless Remote Tank Monitor User Manual

HOST CONFIGURATION WITH LEGACY CLIENT SUPPORT

Ordinary Location And Installation Only
(Not Certified For Hazardous Location)

Document Revision 1.0

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SMARTank ST100 Series

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Revision History

Version	Date	Description of Changes
1.0	5/20/2025	Initial Release, ST100

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Compliance

SkyTank Gateway

Model: ST100

FCC ID: MTFST1001

Contains FCC ID: R17ME910G1W1 and Y82-DA14531MOD

IC: 2175D-ST1001

Contains IC: 5131A-ME910G1W1 and 9576A-DA14531MOD



NOTICE:

This device complies with Part 15 of the FCC Rules and contains license-exempt transmitter(s)/ receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTICE:

Changes or modifications made to this equipment not expressly approved by (manufacturer name) may void the FCC authorization to operate this equipment.

Radiofrequency radiation exposure Information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated at a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

WARNING!**For Your Safety:**

- Read these installation and operation instructions carefully. Failure to follow these instructions may result in death or serious injury.
- Caution: The batteries used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 60°C (140°F) or dispose of in fire. Replace batteries with 4x SkyTank P/N 73004301 only. Use of other batteries may present a risk of fire or explosion.
- Only qualified service personnel may install or repair this equipment.
- Do not disassemble the housing unless the area is known to be non-hazardous. Remove the electronic enclosure from the hazardous area prior to changing the battery pack.
- Substitution of parts may impair the intrinsic safety of this equipment.
- This equipment must be installed in accordance with local requirements and the National Electric Code.

ST100 Introduction

Overview

ST100 is a wireless communication device that provides quick and easy access to remote tank information such as product level and volume. Intended for supplier-managed inventory programs, ST100 utilizes the latest Internet and Cellular technologies to provide instant access to inventory information around the globe. Coupled with the SmartTank® information website, ST100 can provide a tremendous advantage over conventional systems for inventory management, asset control, and information exchange.

For complete function, the ST100 gateway unit requires an ST1XX sensor unit to be attached. The ST100 is available in Host configurations with support for legacy Client devices. This is advantageous where a number of tanks are co-located together such that a single Host unit may communicate with several Clients. The advantage is that only one Cellular radio can perform all communications with the SkyBitz Data Center for itself and its Clients, thus simplifying installation and maintenance. Contact SkyBitz Tank Monitoring sales for more information.

For Your Safety

Read these installation and operation instructions carefully. Failure to follow these instructions may be dangerous or illegal.

Only qualified service personnel must install or service this equipment.

ST100 Specifications

Hardware Specifications

Wireless Communications	LTE-M (AT&T) WLAN (ISM915)
Housing	Weatherproof (IP54); UL recognized (UL94V-0); Polypropylene (30% infill glass) LEXAN™ FR Resin 943A
Unit Gross Weight	Without Sensor Interface Unit Assembly: 0.97 lbs. (0.440 kg)
Battery Type	Four L91 Lithium 1.5V – Approved Battery Cells, Telular Replacement P/N 73004301
Expected Battery Life	One call out per day – up to 20 months Three call outs per day – up to 14 months Battery Lifetime dependent on attached Sensor Unit

Environment

Storage Temperature Range	-13°F to 140°F (-25°C to 60°C)
Operating Temperature Range	-13°F to 140°F (-25°C to 60°C)

Theory of Operation

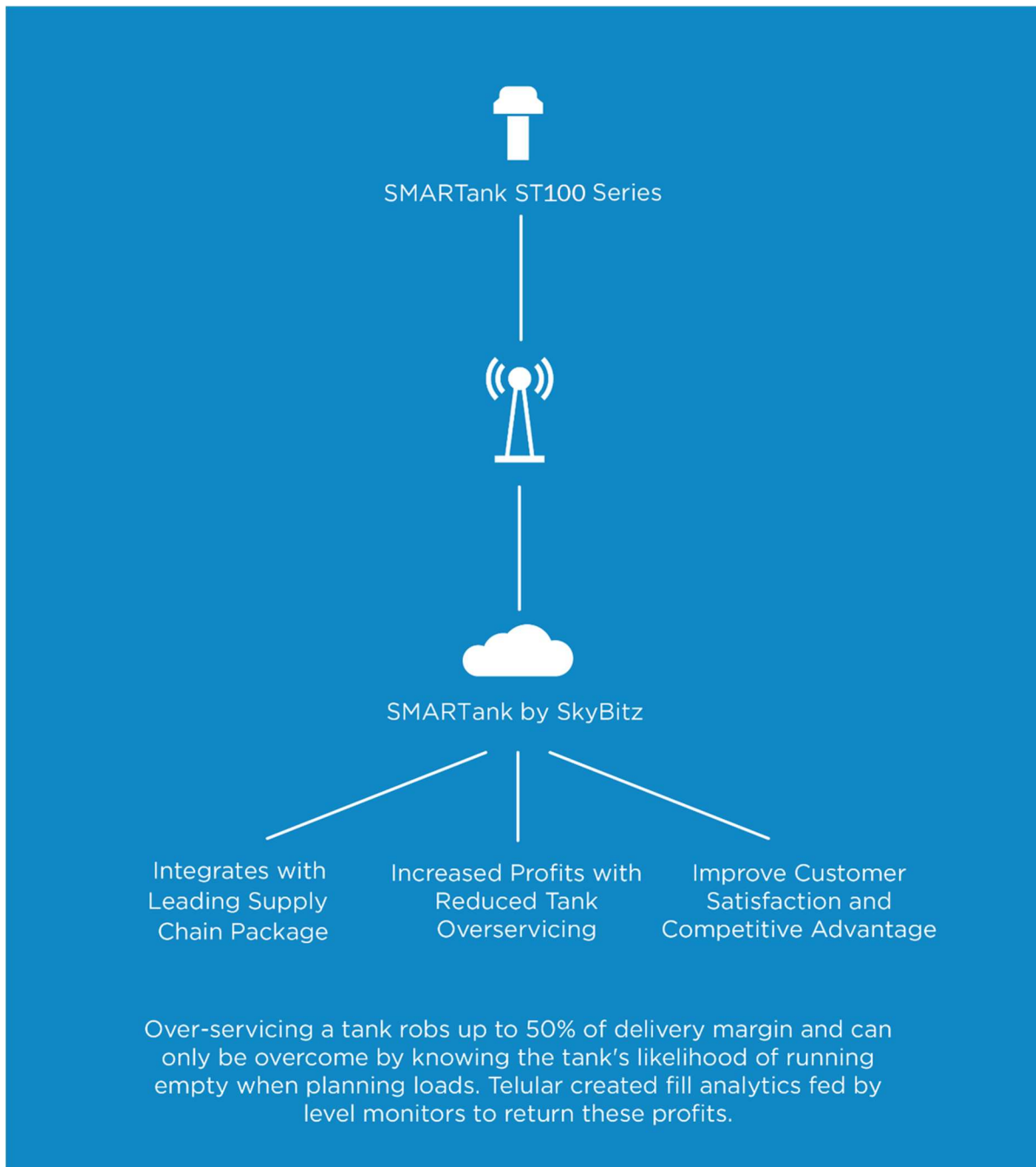


Figure 1

Transfer of Data

The ST100 communicates to the SmartTank® Data Center using Cellular technology. This technology allows the unit to transmit data to the SmartTank® Data Center using the existing network of Cellular towers deployed throughout North America and around the globe. Once the data is at the SmartTank® Data Center, it may be viewed over the Internet using a standard web browser (i.e. Microsoft Edge, Firefox, or Chrome), downloaded to applications such as Microsoft Excel, or it may be used to trigger events such as email or text message to a local sales or service representative. To access the data provided by the ST100 unit, a current monitoring service agreement with SkyBitz is required. For assistance with accessing the SmartTank website, contact SkyBitz Customer Support at **800-909-7845** or go to <https://www.skybitz.com/customer-support>. To access SmartTank Portal, go to <https://new.SmartTank.com/login>.

Since the ST100 is a wireless device, care must be taken when installing the unit to minimize interference from nearby equipment or structures.

Product Highlights

- Simplified installation with a single plug-and-play assembly
- Quick and easy battery replacement
- Modular and scalable design that reduces maintenance costs
- Compatible with flexible sensor and data transport technologies
- Streamlined SKUs improve shipping efficiency
- No telephone line required for communication
- Operates without an external power source
- Epoxy-free construction enables a streamlined assembly process and enhances enclosure durability
- Host configurations available for seamless pairing with other units
- Fully integrated with the SmartTank Portal

Installation

Safety Precautions

This product must be installed and maintained in strict accordance with the National Electrical Code and any other applicable local electrical codes.

Failure to observe this warning could result in serious injuries or damages.

GENERAL Warnings!

- Caution: The batteries used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 60°C (140°F) or dispose of in fire. Replace the batteries with 4x Telular part number 73004301 only. Use of other batteries or power source may present a risk of fire or explosion. Use of other batteries will void the warranty.
- **Do not** install the ST100 **batteries** where hazardous vapors are present.
- **Do not** use the ST100 where blasting is in progress.
- Service may be limited in areas that do not have local Cellular coverage.
- Canadian Safety Agency (CSA) has not tested the performance or reliability of the Global Positioning System (GPS) and/or Enhanced 911 (E911) hardware, GPS and/or E911 operating software or other GPS and/or E911-related aspects of this product. CSA certification does not cover the performance or reliability of the GPS and/or E911 hardware, GPS and/or E911 operating software or other GPS and/or E911-related aspects of this product. CSA MAKES NO REPRESENTATIONS, WARRANTIES OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY GPS AND/OR E911 RELATED FUNCTIONS OF THIS PRODUCT.

Initial Inspection

When you receive the ST100 unit, thoroughly inspect it for any damage which may have occurred during shipping. If there is any damage to the ST100, contact SkyBitz Tank Monitoring Customer Support at **800-909-7845** or email TelemetrySupport.telular@ametek.com.

Locate the packing checklist in the shipping container. Check for any missing items before you begin installation of the ST100.

Tools Required for Installation:

- Security Torx Head Screwdriver/Bit, T10 Size
 - Used for set screw

Installation Precautions

The ST100 Gateway unit is installed directly to the Sensor unit. Please reference the User/Install manual of ST1XX Sensor unit for more instructions on how to connect to each type of sensor. Do not damage the cable. Avoid tight bends or slicing of the outer sheath of the cable with sharp objects. You may void your warranty if this occurs.

Installation of the ST100

- Install ST100 to a preinstalled sensor unit.
- Disclaimer: do not use the ST100 to torque the sensor unit.
- Install the set screw to secure the ST100 to the sensor unit.



Figure 1: ST100 Gateway unit mounted to sensor unit

At this point, the ST100 is in an inactive state. ST100 should be swiped with a magnet to change into an active state. The green LED on the circuit card should begin to flash.



Figure 2: ST100 Gateway unit being magnet swiped over blue magnet indicator

- Examine the LED sequence and verify proper communications with the SmartTank Portal.

Allow the ST100 to complete the communications process. This could take several minutes, and the LEDs will go dark when the process is complete. If the **red** LED lights, then an error has occurred. Count the number of red flashes to diagnose the error code. See **SkyTank Host General LED Descriptions and Battery Warning**

HOST	LED Description*
Power ON	A slow GREEN LED flashes followed by alternating GREEN LED and RED LED flashes.

Active on Cellular Network	RED LED will go out and the GREEN LED will start to flash slowly while attempting to register on the cellular network.
Connected to Cellular Network	GREEN LED will go steady on
Successful Call	GREEN LED flashes and goes out.
Battery life less than 5%	Yellow LED flash as fast
Battery life less than 20%	Yellow LED flash as slow

* If the call is unsuccessful, the RED LED will light with the GREEN LED flashing with the error number.

- Host Operation section for error code definitions.

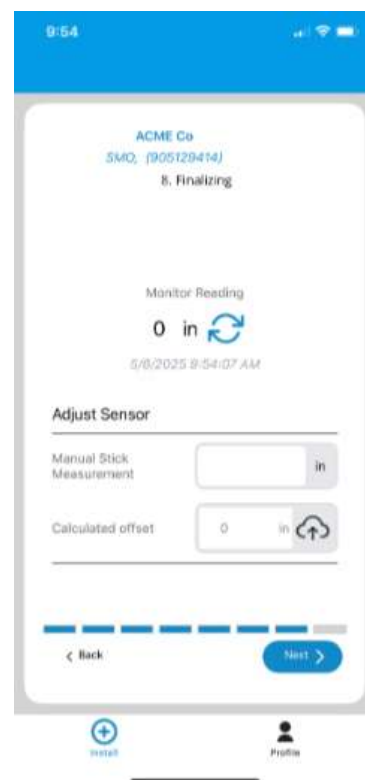
Calibration and Verification.

Use the “Tank Installer” Mobile App to complete installation and configure ST100 units. The app streamlines installation and verification, syncing data with the server for secure record-keeping. Download "Tank Installer" from the App Store or Google Play.

Follow the installation steps, enter a manual stick measurement and apply the offset if needed. The calculated offset will display automatically:

- Blue highlight: No further action needed.
- Red highlight: Confirm the measurement.

The app automatically syncs installation data, including sensor offset, with the server to ensure accuracy. Use the SmartTank web portal for further details and to verify tank levels and calibration parameters.



Accessing the SmartTank Website

SkyTank integrates seamlessly with the SmartTank Portal to create a fully connected ecosystem for tank monitoring and management.

All-in-One Solution: The platform combines precise tank monitoring with robust management tools to maximize efficiency, streamline workflows, and provide actionable insights.

The SmartTank Portal optimizes all aspects of tank logistics. It enables customers to manage demand, improve fill efficiency, and monitor key metrics such as daily usage trends, short fills, low-level alarms, and fill detection. Advanced algorithms forecast critical dates—Date to Order, Date to Safety Stock, and Date to Empty—by analyzing historical inventory data. These insights help increase productivity and optimize asset utilization.

To access the SmartTank portal, visit <https://new.smarttank.com/login>. Log In with your Username and Password provided after your service agreement with SkyBitz Tank Monitoring is finalized. If you forget your credentials, click "Forgot Password" on the login page.

Upon login, the Dashboard provides an overview of deliveries, inventory levels, alarms, and usage patterns. The Tank List allows you to filter tanks by location, product type, region, and more. You can view detailed inventory data, export historical usage reports, and set alarm notifications to avoid service interruptions. Multiple permission levels are available, including administrative access.

Each Wireless Monitor is assigned a default tank entry linked to the user's account. Tank installations can be completed using the Tank Installer or SmartTank mobile apps (available from the App Store) or via the Web Portal. During setup, customers must input essential configuration details, including Tank Name, Product Type, Location, and Contact Information.

Tank Measurements – Website Tank Configuration

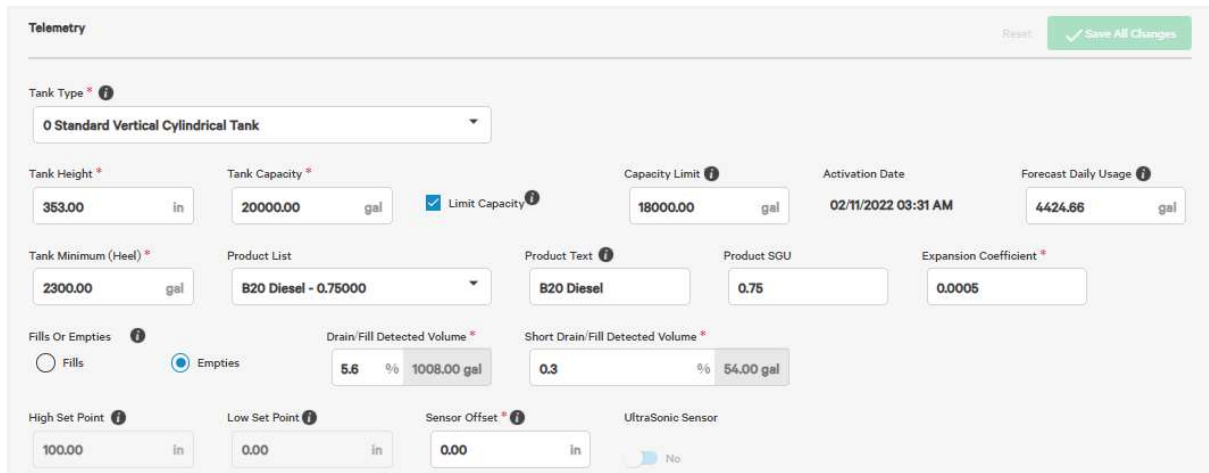
Accurate tank measurements are essential for completing the installation process and ensuring proper volume tracking in the SmartTank Portal.

To configure your tank, the following specifications are required:

- Tank capacity
- Tank dimensions
- Total tank volume
- Tank product
- Tank type

These measurements ensure that the system correctly calculates product levels and usage.

See the tank setup web page below.



The Telemetry configuration interface includes the following fields and controls:

- Tank Type:** 0 Standard Vertical Cylindrical Tank
- Tank Height:** 353.00 in
- Tank Capacity:** 20000.00 gal
- Limit Capacity:** ☒
- Capacity Limit:** 18000.00 gal
- Activation Date:** 02/11/2022 03:31 AM
- Forecast Daily Usage:** 4424.66 gal
- Tank Minimum (Heel):** 2300.00 gal
- Product List:** B20 Diesel - 0.75000
- Product Text:** B20 Diesel
- Product SGU:** 0.75
- Expansion Coefficient:** 0.0005
- Fills Or Empties:** ☐ Fills, ☒ Empties
- Drain/Fill Detected Volume:** 5.6 % 1008.00 gal
- Short Drain/Fill Detected Volume:** 0.3 % 54.00 gal
- High Set Point:** 100.00 in
- Low Set Point:** 0.00 in
- Sensor Offset:** 0.00 in
- UltraSonic Sensor:** ☐ No

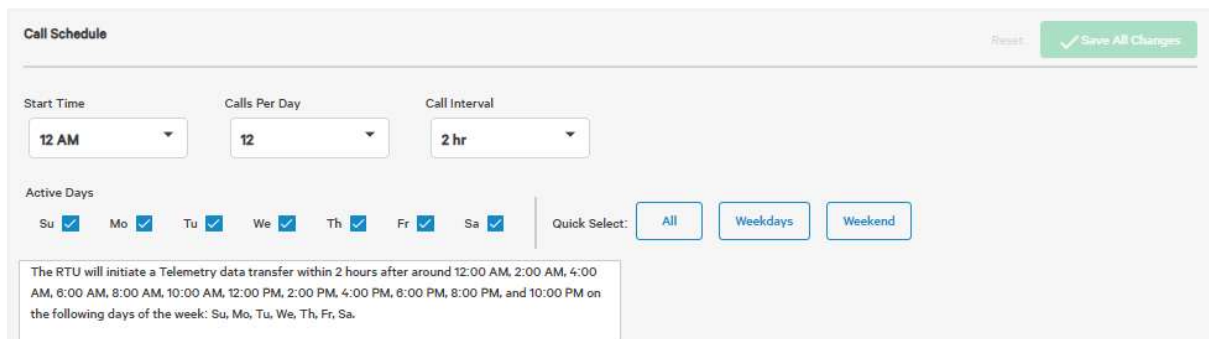
Setting the Number of Callouts per Day

The ST100 has enhanced the user's ability to customize the scheduled inventory Callouts found under the tank "Setup" tab in the Call Schedule Panel. Additionally, there are multiple alarm threshold callouts separately selectable under the tank's "Alarms" tab in the Device Alarm Setup panel.

The tank's default setting is a single Callout per day in the early morning hours. This setting is automatically active upon installation without any further programming of the Call Settings on the tank Setup tab.

Scheduled Callouts

There are 4 specific parameters for the scheduled Callouts that need to be programmed as indicated below:



The Call Schedule configuration interface includes the following fields and controls:

- Start Time:** 12 AM
- Calls Per Day:** 12
- Call Interval:** 2 hr
- Active Days:** Su ☒, Mo ☒, Tu ☒, We ☒, Th ☒, Fr ☒, Sa ☒
- Quick Select:** All, Weekdays, Weekend

The RTU will initiate a Telemetry data transfer within 2 hours after around 12:00 AM, 2:00 AM, 4:00 AM, 6:00 AM, 8:00 AM, 10:00 AM, 12:00 PM, 2:00 PM, 4:00 PM, 6:00 PM, 8:00 PM, and 10:00 PM on the following days of the week: Su, Mo, Tu, We, Th, Fr, Sa.

Start Time allows the selection of a specific time, within a 1 hour window, in which the tank will call out the first time during that 24-hour period. The selection is made using the drop-down list box where all the valid selections are listed. This sets the starting time or first callout from this tank for the day.

Call Interval allows the time spacing, in hours, between subsequent Callouts from the tank. Select the desired interval from the drop-down list-box.

Calls per Day allows the selection of the specific number of Callouts for a given day. Select the number of Callouts using the drop-down list-box.

Active Days allows the selection of the specific days of the week when the Callouts should occur. Each day of the week can be activated or deactivated by clicking on the Checkbox independent of the others.

Note: that the selection of the first three parameters above are inter-related so that the Callouts can occur in a single 24-hour period. Hence it is important to select the **Preview Schedule** which brings up a summary of the settings made and will display an error if the selections conflict with each other.

Preview Schedule allows one to view the programmed settings. An error warning will be displayed if the settings conflict. It is advisable to always select this after programming or changing the four scheduled Callout parameters above thereby eliminating any unintentional errors.

Call On % Change

Call On % Change allows the Callout based on a % inventory change, increase or decrease, regardless of the scheduled Callouts programmed above. This Callout is not dependent on the scheduled Callout settings above.

Effectivity of Callout Setting Changes or Programming

All changes to a tank's Call Schedule (and other parameters) will remain "Pending" until the Call Schedule is transferred to the ST100 device. Pending "Call Schedule" updates are by default transferred to the ST100 device on Sunday's and each time a manual start-up (reset) action is performed. Following a successful transfer of "Pending" device configuration changes, the website transitions the device to an "Updated" state. A user with "Diagnostic" privileges can view the device state from the Tank Details page under the diagnostic panel. A device is considered updated when Transmit Sequence count is equal to the Acknowledged Sequence count.

Normal Operation

Once communication is established and tank information has been transmitted to the SmartTank Data Center, the ST100 device will continue to send data based on the defined call schedule. This tank data can be accessed online. Please refer to the next chapter of this manual for detailed instructions on accessing the data.

The real power behind the SmartTank® Inventory Management System lies in the SmartTank web portal. Using a standard web browser (such as Microsoft Edge, Firefox, or Chrome), users can:

- View the current status and tank levels of connected devices
- Download historical usage data for analysis in applications like Microsoft Excel
- Configure alarm thresholds that trigger automatic notifications (via email or text) to designated service or sales personnel

SmartTank is a secure platform built with a proactive cybersecurity approach. It utilizes advanced security tools, continuous monitoring, and rigorous security testing to protect your data and maintain confidentiality. The platform is regularly updated with new features, ensuring it evolves with customer needs and industry advancements.

In addition to the web portal, SmartTank offers two free mobile apps for Apple and Android devices. To get started, simply download and install the SmarTank app from the App Store or Google Play, then log in with your credentials. The mobile app provides 24/7 access to critical tank data, helping users stay informed about what's needed, when, and where — all from the convenience of a mobile device.

Mobile Apps:

SmarTank: Gain full visibility and control over your storage tanks—anytime, anywhere. The SmarTank app provides 24/7 access to key tank metrics including level, temperature, and location. Customize notifications, alerts, and alarms based on your own criteria and prefer timeframes to stay informed and responsive.



Tank Installer: A fast and streamlined solution for tank installation and verification. Specifically designed for installers, this app simplifies the setup process and ensures secure, accurate updates to the SmartTank server.



Servicing and Troubleshooting

Error Codes

On a Host device a normal LED light sequence consists of a number of Green LED flashes whenever performing a Magnet Swipe, plugging in the battery, or pushing the Reset Button (SW2). Swiping A Magnet Swipe is the preferred method of resetting the device. Following the initialization period the Red and Green LED will flash alternately. During this time, communication is occurring between the Host/Client(s).

After a few seconds the LED should blink more slowly. This indicates it is talking with the Cellular Network. The ST100 should be transmitting information to the Network. This part can take a couple of minutes. Once the process is finished the light will blink quickly and go off.

If an error occurred during the process the red light would appear and the green light would go out. After a short pause the green light would blink, indicating one of the error codes shown below.

If the data transmission was not successful, a red LED will light and remain lit while the green LED flashes the error codes below.

SkyTank Host General LED Descriptions and Battery Warning

HOST	LED Description*
Power ON	A slow GREEN LED flashes followed by alternating GREEN LED and RED LED flashes.
Active on Cellular Network	RED LED will go out and the GREEN LED will start to flash slowly while attempting to register on the cellular network.
Connected to Cellular Network	GREEN LED will go steady on
Successful Call	GREEN LED flashes and goes out.
Battery life less than 5%	Yellow LED flash as fast
Battery life less than 20%	Yellow LED flash as slow

* If the call is unsuccessful, the RED LED will light with the GREEN LED flashing with the error number.

Host Operation for Error LED Flashes

Number of Green Flashes	Error Code Description
-------------------------	------------------------

1	No Observation from Datacenter: Could be a datacenter issue or could be a cellular communication issue.
2	No Data Connection: Could be cellular communication issue or could be config/activation issue. Verizon devices can display this error if the device did not receive the APN update from Verizon during activation.
3	Radio Respond Error: Could not power up cellular radio – if repeatable, could be a low battery or a hardware problem.
4	No cellular service: Could be cellular communication/coverage issue or could be activation issue.
5	Busy: Data connection lost and cannot reconnect on this callout. Please try another callout after a few minutes.
6	No datacenter registration: Successfully registered on cellular network and created data connection but unable to communicate with datacenter. AT&T devices can display this error if the device was not configured for the proper Jasper Communication Plan. Check SIM configuration on AT&T Control Center.
8	Transmission failure: Probably cellular communication issue, device successfully completed cellular registration, data connection, and datacenter registration.
10	Call Limit Reached: Max calls per day limit surpassed, power cycle to clear counter.

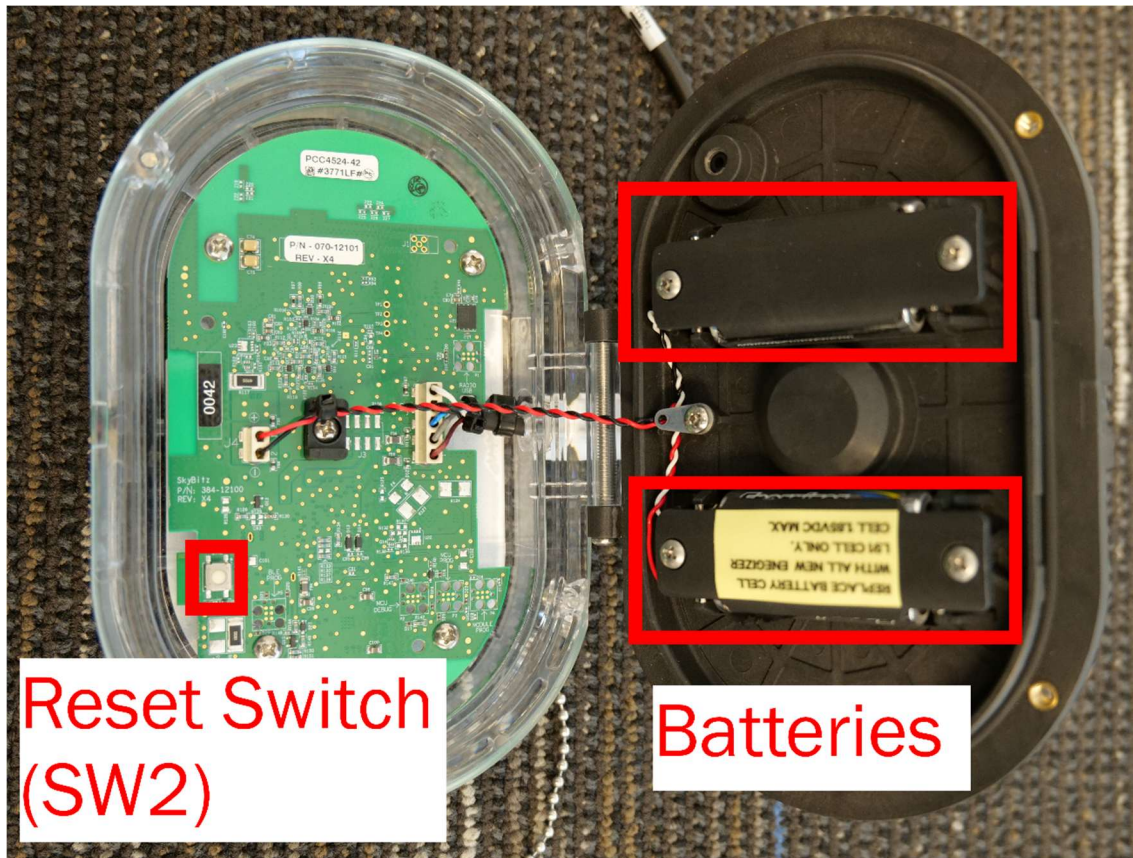


Figure 1. ST100 Major Components (Host)

Troubleshooting

Nothing happens when the magnet is swiped to initiate a callout.

- ✓ Disconnect the ST100 from the attached sensor unit, if any.
- ✓ Remove the ST100 from the Hazardous area
- ✓ Disconnect the batteries.
- ✓ Push the button (SW2).
- ✓ Reinstall the batteries into the Gateway Unit. If the green LED does not come on, replace the batteries with new batteries.
- ✓ Reinstall the gateway on the sensor unit.

Unit cannot transmit to data center.

- ✓ Reference the LED Error Code Description above.
- ✓ Verify that there is cellular coverage in the area.
- ✓ Check for interfering structures such as tanks, buildings, or large equipment.
- ✓ Reposition the unit if possible.



- ✓ Verify the Serial Number of the unit on the website.

The level reading is incorrect.

- ✓ Ensure the sensor is properly located inside the tank, i.e. laying on the bottom vs offset.
- ✓ Normally, all of the sensor parameters are set up by your SkyBitz Tank Monitoring account representative when the tank is initially configured. On rare occasions, the information may not be correctly entered. If you have verified the tank information and the tank level is still incorrect, there may be several causes for the incorrect reading.
- ✓ Verify the tank dimensions, high set point, and low set point via the website for uplink monitors. In general, the low set point is zero, and the high set point for submersible set points is 27.78 times the PSI range of the submersible sensor divided by the SG (specific gravity/density).

$$\text{High Set Point} = \frac{27.78 * \text{PSI Range(of sensor)}}{\text{Specific Gravity(of fluid)}}$$

The level reading is correct, but volume is incorrect.

- ✓ Verify all the tank settings are configured properly/accurately set. In particular, tank type and product SGU are correct
- ✓ Verify the correct tank type is selected on the setup page on SmartTank.com
- ✓ Verify the tank capacity. This should be the volume in the tank at the tank height.
- ✓ Verify that the correct strapping chart (tank type dropdown on setup page) is used.

The unit has stopped calling.

- ✓ Verify the batteries are functional. Only Replace with Telular PN #73004301.
- ✓ Verify cellular coverage
- ✓ Observe LED sequence and reference LED troubleshooting table above

Obtaining Technical Support

If you still are having trouble, contact SkyBitz Tank Monitoring Customer Service at:

Office: 1-800-909-7845 or telemetrysupport.telular@ametek.com

You will need the following information:

- ST100 Serial Number (label on the side of top lid).
- Tank location (city/state).
- Tank product

REMEMBER: For security reasons, no one from SkyBitz Tank Monitoring will ever ask you for your login or password.

If it should be necessary to return this unit to SkyBitz Tank Monitoring for service:

- 1) You must first obtain a Return Authorization Number from SkyBitz Tank Monitoring.
- 2) This number must be clearly marked on the outside of the shipping container and on the service card which was supplied with the unit.
- 3) Place the unit with the service card in the original container and ship it prepaid to the address on the service card.

Appendix

Replacement Parts

- Magnetic lanyard Telular PN#031-00095
- 4 batteries with Telular PN #73004301, Energizer L91 batteries

Battery Replacement

WARNING!

Only hand tools are permitted when working with the Skytank gateway unit. Replace the batteries with Telular part number P/N 73004301 only. Use of any other battery type may present a risk of fire. Ensure the device is completely sealed upon completion or environmental ingress may occur. Unapproved batteries will void the warranty.

- Loosen the two captive screws completely
- Open the unit
- Unscrew the two battery covers with a Phillips head screwdriver, retain screws, use hand tools only
- Remove all four batteries, avoid using a tool
- Replace all four batteries with Telular PN #73004301, Energizer L91 batteries
- Install both battery covers with retained screws, using hand tools only, to 5 in-lbs.
- Close the lid of the unit
- Tighten the two captive screws to 16 in-lbs.
- Inspect the seal of the device for no open gaps. Attempt to reseal if gaps are present.

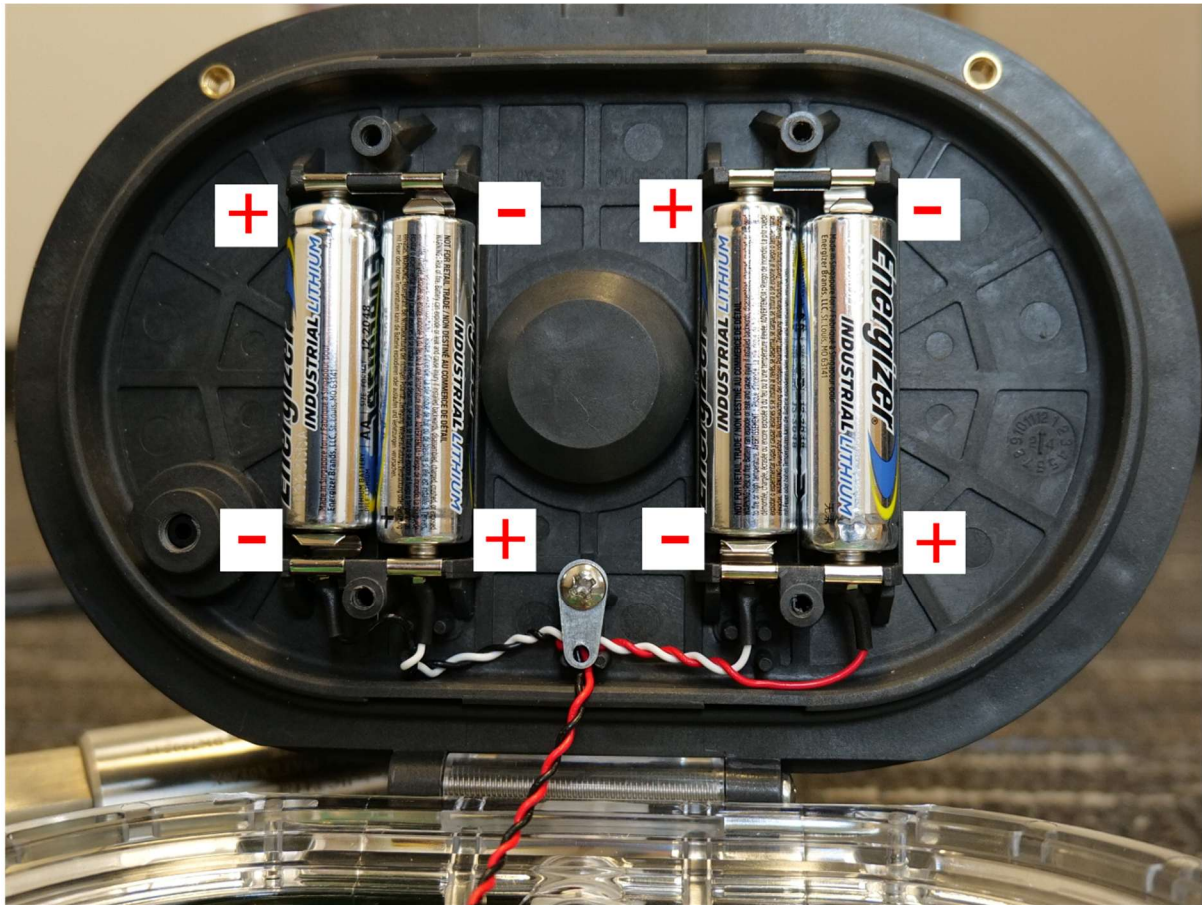


Figure 1. Battery Pack, PN #73004301

Sealed Gateway Unit Checks

WARNING!

Only hand tools are permitted when working with the Skytank gateway unit. When opening the unit, it is important to ensure the unit is completely resealed upon completion of work. The screws should be completely tightened, with no visible air gaps present around the unit. It may be necessary to adjust the O-ring if it was moved.

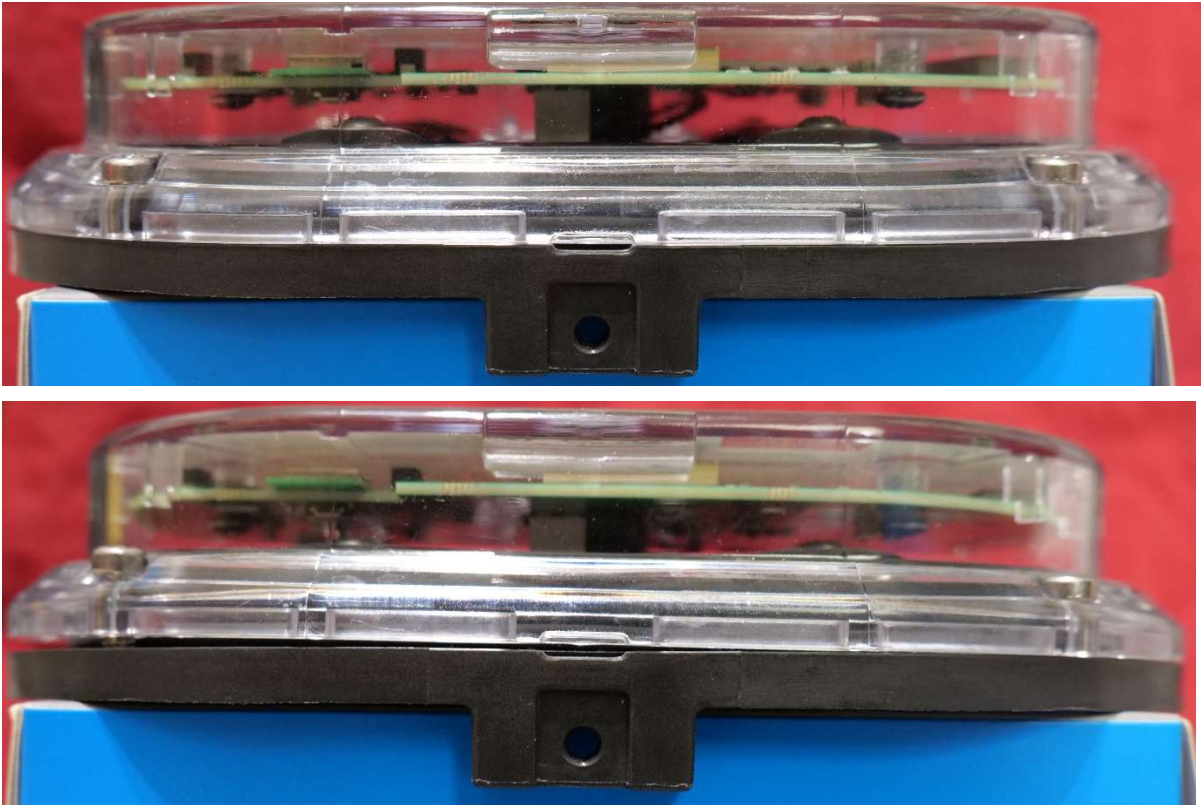


Figure 2. (Upper) Completely sealed unit. (Lower) Broken Seal due to loose screw on left side.