



REMOTE TANK OVERFILL ALARM

INSTALL GUIDE

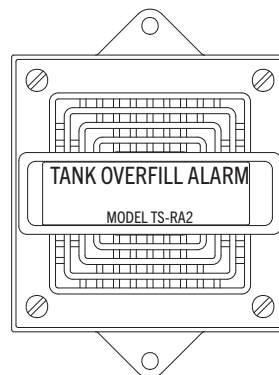
000-1027 r10

MODELS

TS-RA1

TS-RA2

TS-RK



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CONVENTIONS USED IN THIS DOCUMENT

This document includes safety precautions and other important information presented in the following format:

NOTE: This provides helpful supplementary information.

IMPORTANT: This provides important supplementary information and instructions to avoid damaging hardware or a potential hazard.

▲ CAUTION: This indicates a potentially hazardous situation that could result in minor or moderate injury if not avoided. This may also be used to alert against unsafe practices.

▲ WARNING: This indicates a potentially hazardous situation that could result in severe injury or death if not avoided.

▲ DANGER: This indicates an imminently hazardous situation that will result in death if not avoided.

OPERATING PRECAUTIONS

Franklin Electric equipment is designed to be installed in areas where volatile liquids such as gasoline and diesel fuel are present. Working in such a hazardous environment presents a risk of severe injury or death if you do not follow standard industry practices and the instructions in this document. Before working with or installing the equipment covered in this document, or any related equipment, read this entire document, particularly the following precautions:

IMPORTANT: To help prevent spillage from an underground storage tank, make sure the delivery equipment is well-maintained, that there is a proper connection, and that the fill adaptor is tight. Delivery personnel should inspect delivery elbows and hoses for damage and missing parts.

▲ CAUTION: Use only original Franklin Electric parts. Substituting non-Franklin Electric parts could cause the device to fail, which could create a hazardous condition and/or harm the environment.

▲ WARNING: Follow all codes that govern the installation and service of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on while installing or servicing this product. Refer to this document (and documentation for related equipment) for complete installation and safety information.

▲ WARNING: Before entering a containment sump, check for the presence of hydrocarbon vapors. Inhaling these vapors may cause dizziness/unconsciousness, and if ignited, can explode causing serious injury or death. Containment sumps are designed to trap hazardous liquid spills and prevent environmental contamination, so they can accumulate dangerous amounts of hydrocarbon vapors. Check the atmosphere in the sump regularly while work is in process. If vapors reach unsafe levels, exit the sump and ventilate it with fresh air before resuming work. Always have another person standing by for assistance.

▲ WARNING: Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A, and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.

▲ WARNING: Always secure the work area from moving vehicles. The equipment in this document is usually mounted underground, so reduced visibility puts service personnel working on it in danger from moving vehicles that enter the work area. To help prevent this safety hazard, secure the area by using a service truck or other vehicle to block access to the work area.

▲ DANGER: Inspect the installation location for potential ignition sources such as flames, sparks, radio waves, ionizing radiation, and ultrasound sonic waves. If any potential ignition sources are identified, implement proper safety measures.

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1 Introduction

The TS-RA1 and TS-RA2 (high intensity) alarms are remote audible and visible alarm units for use with Franklin Electric automatic tank gauges. The TS-RK is a remote alarm acknowledge unit for use with TS-RA1 and TS-RA2 and all Franklin Electric automatic tank gauges equipped with remote alarm annunciators.

1.1 Documentation

- This document contains the procedure and related information for installing Remote Tank Overfill alarms. The content herein is intended for personnel who are qualified (certified) in the installation of these alarms (see §2.7).
- Instructions of this document are in English. All other language versions are translations of this original document.
- Information given in this document is provided as a guide only.
 - The Illustrations depict a typical setup and are for instruction and description purposes only.
 - It is the installer's responsibility to ensure that correct and safe procedures are followed at the worksite.
- This document and related documents are available from Franklin Electric at www.franklinfueling.com.

1.1.1 Symbol Legend

 Wear Protective Headwear	 Wear Eye Protection
 Wear Protective Clothing	 Wear High-Visibility Clothing
 Wear Protective Gloves	 Wear Safety Footwear
 Refer to instruction guide.	 Ventilate Before & During Entering
 Ensure Continuous Ventilation	 Connect an earth terminal to the ground
 Disconnect main plug from electrical outlet	
 Disconnect before carrying out maintenance or repair	
 General Warning	 Warning: Industrial vehicles
 Warning: Electricity	 Warning: Flammable Material
 No open flame; Fire, open ignition source and smoking prohibited	

2 Safety/Security

2.1 General Safety Information

- Procedures in this document are only to be performed by people qualified and certified to perform them (see §2.7).
- Personnel working on or with energized equipment must be authorized by relevant regulatory bodies to carry out such work and must have the appropriate training. Check with your employer and relevant regulatory body's rules for working with energized equipment.
- Obey all local laws, rules, regulations, and instructions in this document. In case of inconsistency or contradiction between information contained in this document and any laws, rules and regulations, obey the stricter of the two.
- Keep unqualified personnel at a safe distance during installation.
- If it is necessary to remove safety/security devices, immediately reinstall the safety/security devices after completing the work.

2.2 Installation & Service Access

Certified Installer, Service, or Programmer*

Only Franklin Electric certified installers, service (technician) and programmers are allowed to access both the console interface and areas internal to the console.

See §2.7 for information on certification training.

Site Owner or Operator*

The site owner or operator of the console is only allowed to access the user interface. Access to areas internal to the console is prohibited.

If your console is serviced by someone who is not a Franklin Electric certified installer, service (technician), or programmer, **your warranty will be void.*

2.3 Documentation Availability

- Site Owner/Operator – Save this guide for future use, and make sure to provide it to anyone who services this equipment.
- Always reference the guide(s) that came with the equipment for a complete list of installation and safety precautions. The most current Franklin Electric documentation can be found online at www.franklinfueling.com.

2.4 Hazard Assessment

Prior to beginning work and prior to recommencing work after leaving and returning to the worksite, a worksite, *pre-job hazard assessment* must be performed to identify safety and environmental needs. At a minimum, this hazard assessment should:

- Identify possible hazards and risks.
- Identify the safety needs of the job.
- Identify the correct procedures, practices and equipment.
- Eliminate unsafe conditions and actions from the worksite.
- Identify the need for personal protective equipment.
- Inspect equipment before use.
- Confirm sheaths of all cables are secured and undamaged.
- Confirm plugs and connectors are properly connected and serviceable.
- Perform ongoing risk assessment during the project.

2.5 Required Personal Protective Equipment (PPEs)

These PPEs are required during all phases of installation.



Wear Protective Clothing



Wear Eye Protection



Wear High-Visibility Clothing



Wear Protective Gloves



Wear Protective Headwear



Wear Safety Footwear

2.6 Cyber Security

This product is designed to be connected to and to communicate information and data via a network interface. It is solely the owner's responsibility to provide and continuously ensure a secure connection between the product and the Owner's network or any other network (as the case may be).

The Owner shall establish and maintain appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ***The Owner shall also ensure that the device and/or any connecting devices have the latest firmware version available to ensure device security features are up to date.***

The manufacturer, Franklin Electric, and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

2.7 Qualifications and Responsibilities

2.7.1 Qualifications for Certification

To be considered “qualified”, individuals shall pass training from the applicable certification training course (online or live).

2.7.2 Responsibilities

The following responsibilities are for guidance only and are not limited to those listed here.

It is the responsibility of:

- The owner of the install site(s) to ensure that all alarm installers shall be certified (see § 2.7.1), follow all local laws, rules and regulations, along with the instructions and the specifications listed in this document.
- The certified user(s) to know the Remote Tank Overfill Alarm(s) and its safe use.
- The certified user(s) to have and maintain a valid Franklin Electric training certification (see § 2.7.1).

FE Online or Live
Certification
Training



SCAN / CLICK

3 Pre-Installation Overview

3.1 Upon Receipt of Item(s)

- Verify all items are in accordance with the order.
- Check all items for damage.
- If any item shows damage or is not in accordance with the order, inform Franklin Electric *immediately*.
- Remove the packaging material.
 - Follow all local laws, rules and regulations regarding disposal of discarded parts, packaging material or items and any subsequent components.

3.2 Technical Overview

The TS-RA1 and TS-RA2 Remote Audible and Visual Alarm units and the TS-RK Remote Alarm Acknowledgement unit are used with Fuel Management System (FMS) consoles and mounted near the tank filling site. If the tank product level reaches the FMS overfill alarm set point, then the tank overfill alarm will become active and the TS-RA1 or TS-RA2 remote unit will initiate. An active tank overfill alarm alerts the tank filling attendant to immediately stop the filling operation before a spill occurs. The TS-RK gives the tank filling attendant the means to silence a tank overfill alarm at the filling site. The TS-RK is required when a TS-RA1 or TS-RA2 is connected to an EVO™ Series console, T5 Series console or a Colibri™ automatic tank gauge. When in an alarm condition, depressing the acknowledge button on the TS-RK will silence the TS-RA1 or TS-RA2 at the tank filling site.

3.2.1 Required Tools And Materials

Tools



Materials

- **Wire:** 18 to 14 AWG, 300 Volt, type TFFN, THWN, or THHN.
NOTE: THHN is not available in 18 AWG. *Recommended insulation colors are BLACK, WHITE, GREEN, and BLUE.*
- **Conduit:** ½" or ¾" (the TS-RA2 has a ½" NPT for threaded conduit / fitting).
- **Fittings:** for conduit used, and conduit hold-down clamps.
- **Sealant:** waterproof conduit, fittings, fitting threads, and conduit accesses to the building.
- **Fasteners:** appropriate for the wall construction involved.

3.2.2 Alarm Specifications

NOTE: When properly installed, wired, and programmed, this alarm system will help prevent dangerous fuel spills, environmental contamination, and cleanup costs.

3.2.2.1 TS-RA1

The TS-RA1 is a standard intensity, remote alarm device that has a signal range up to 50'.

Table 3.1 – TS-RA1

Field	Rating/Description
Input Power	115 VAC (96 to 132 VAC), 60 Hz @ 0.125 Amps Maximum
Operating Temperature Range	–31 to 150°F
Humidity Range	Up to 95% humidity
Signal outputs	Visual (low intensity incandescent lamp) and audio tone (85 dB @ 10 feet)

3.2.2.2 TS-RA2

The TS-RA2 is an alarm device that has a strobe-light, and eight user-selectable output tones with two user-selectable sound intensities. In the high-intensity mode, the TS-RA2 has a signal range up to 200'.

Table 3.2 – TS-RA2

Field	Rating/Description
Input Power	115 VAC (96 to 132 VAC), 60 Hz @ 0.125 Amps Maximum
Operating Temperature Range	–31 to 150°F
Humidity Range	Up to 95% humidity
Signal outputs	Visual strobe (15 Candela), and audio tone (99 dB to 75 dB @ 10 feet).

3.3 Location Overview

The mounting location of TS-RA1, TS-RA2, TS-RK units should be based on: cable run length, ease of conduit routing, alarm light visibility, alarm horn audible range limitations, and the distance away from hazardous areas. In addition, the following limitations and requirements must be met.

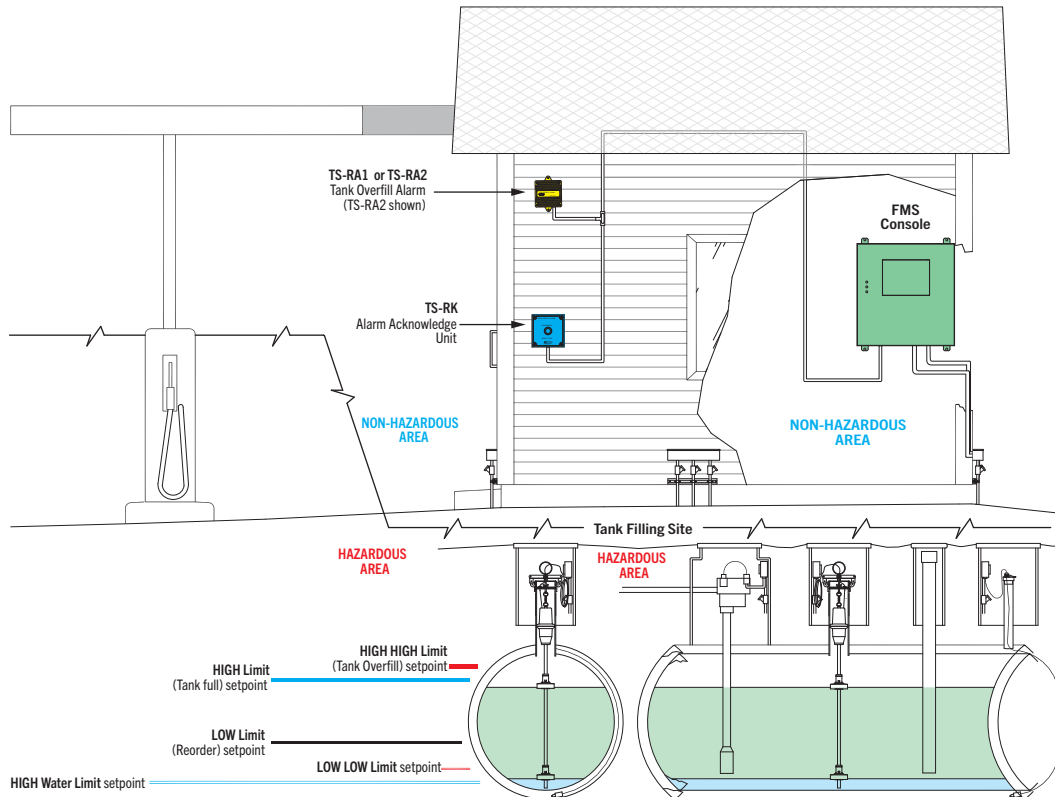


Figure 4.1: TS-RA and TS-RK Installation Overview

- The location of the TS-RA1, TS-RA2, and TS-RK unit enclosures must be less than 1000' away from the 120 VAC electrical power (source) panel.
- The TS-RA1 or TS-RA2 unit should be mounted near the fuel tank filling area.
- The alarm light must be visible and the alarm horn must be audible at the fuel tank filling area.
- These units should be mounted in a protected location that minimizes exposure to direct sunlight, snow, rain, and *does not allow for ANY water ingress*.
- The TS-RK unit should be accessible to the tank filling attendant. *Access to the TS-RK from the filling area must be clear with no obstructions.*

⚠ WARNING:

- DO NOT install the TS-RA1, TS-RA2, and TS-RK units in a volatile, combustible, or explosive atmosphere. *Failure to do so may create an explosion hazard.*
- Run wiring from the console to the TS-RA1, TS-RA2, and TS-RK units in separate conduit apart from any other wiring. *All conduits must enter through supplied non-intrinsically safe enclosure knockouts only. Failure to do so may create an explosion hazard.*

4

Installation



NOTE:

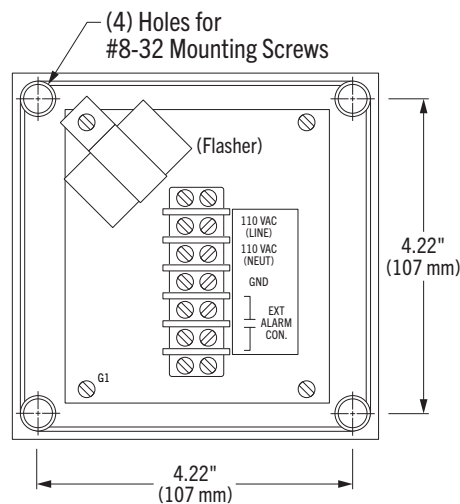
- When the installation is complete, make sure this guide is left with the service station owner or operator.
- Wiring diagrams are § 4.1.2 and § 5 of this guide.

4.1 Install Instructions

4.1.1 Mounting The Units

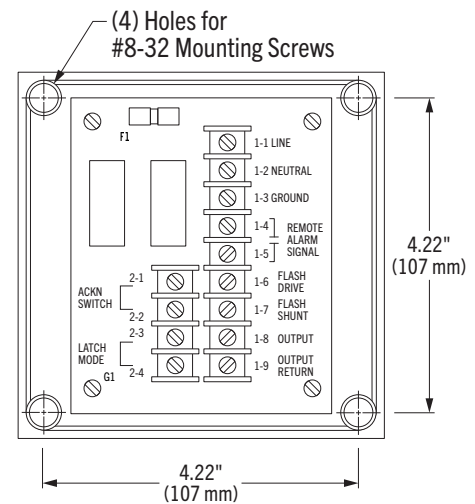
TS-RA1/TS-RK

- Mount the TS-RA1 and/or TS-RK units through the four (4) mounting holes provided in the case under the front cover.



Internal View (Cover Removed)

Figure 2: TS-RA1 Mounting Details



Internal View (Cover Removed)

Figure 3: TS-RK Mounting Details

TS-RA2

- Mount the TS-RA2 unit through the two (2) mounting holes provided.

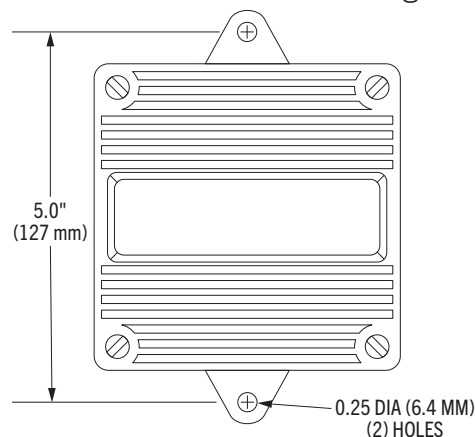
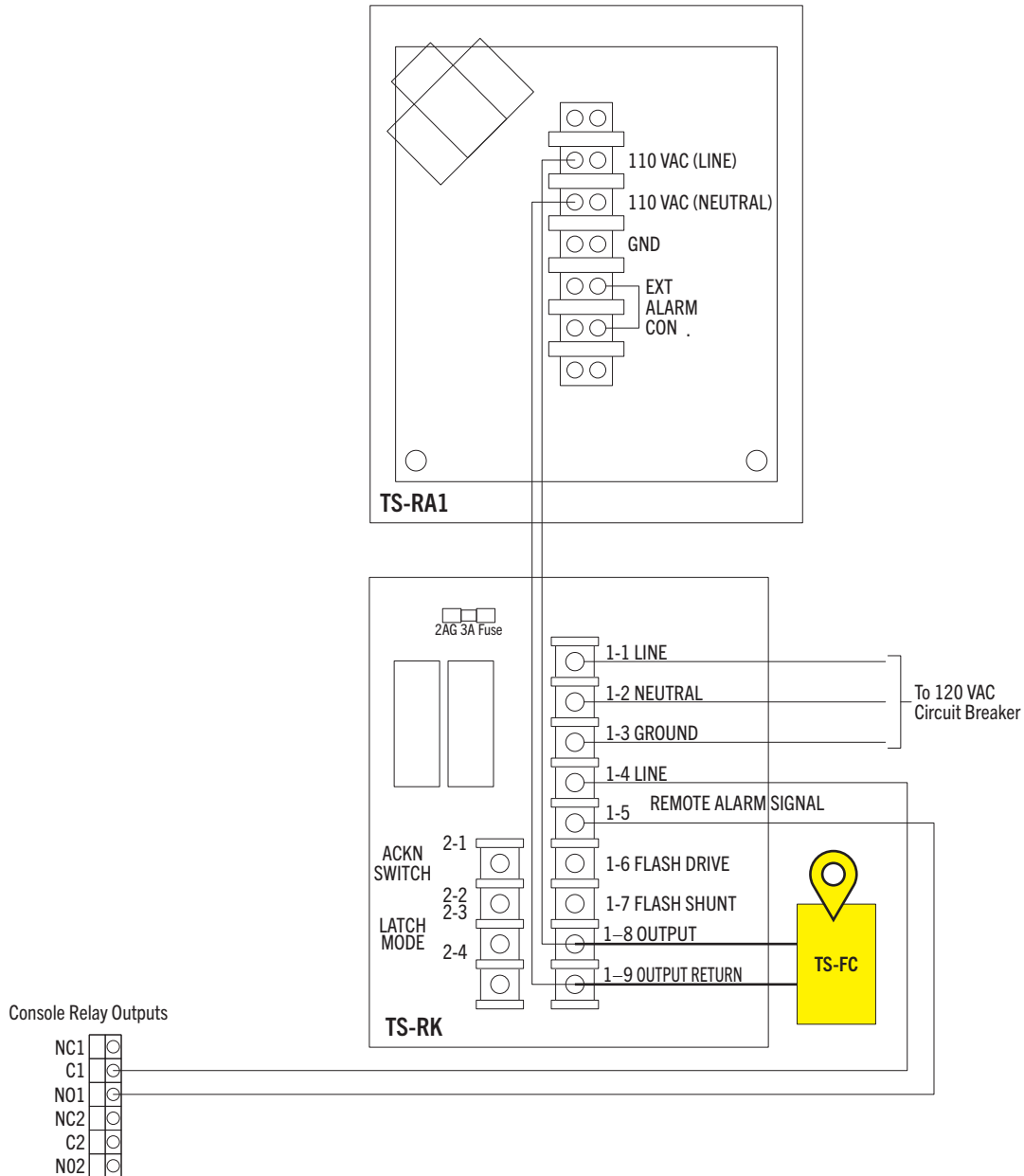


Figure 4: TS-RA2 Mounting Details

4.1.2 Wiring Schematics

4.1.2.1 TS-RA1 / TS-RK

NOTE: Newer TS-RK units ship with TS-FC filter capacitors (📍) that are to be installed on 1-8 and 1-9.



4.1.2.2 TS-RA2/TS-RK

NOTE: Newer TS-RK units ship with TS-FC filter capacitors (📍) that are to be installed on 1-8 and 1-9.

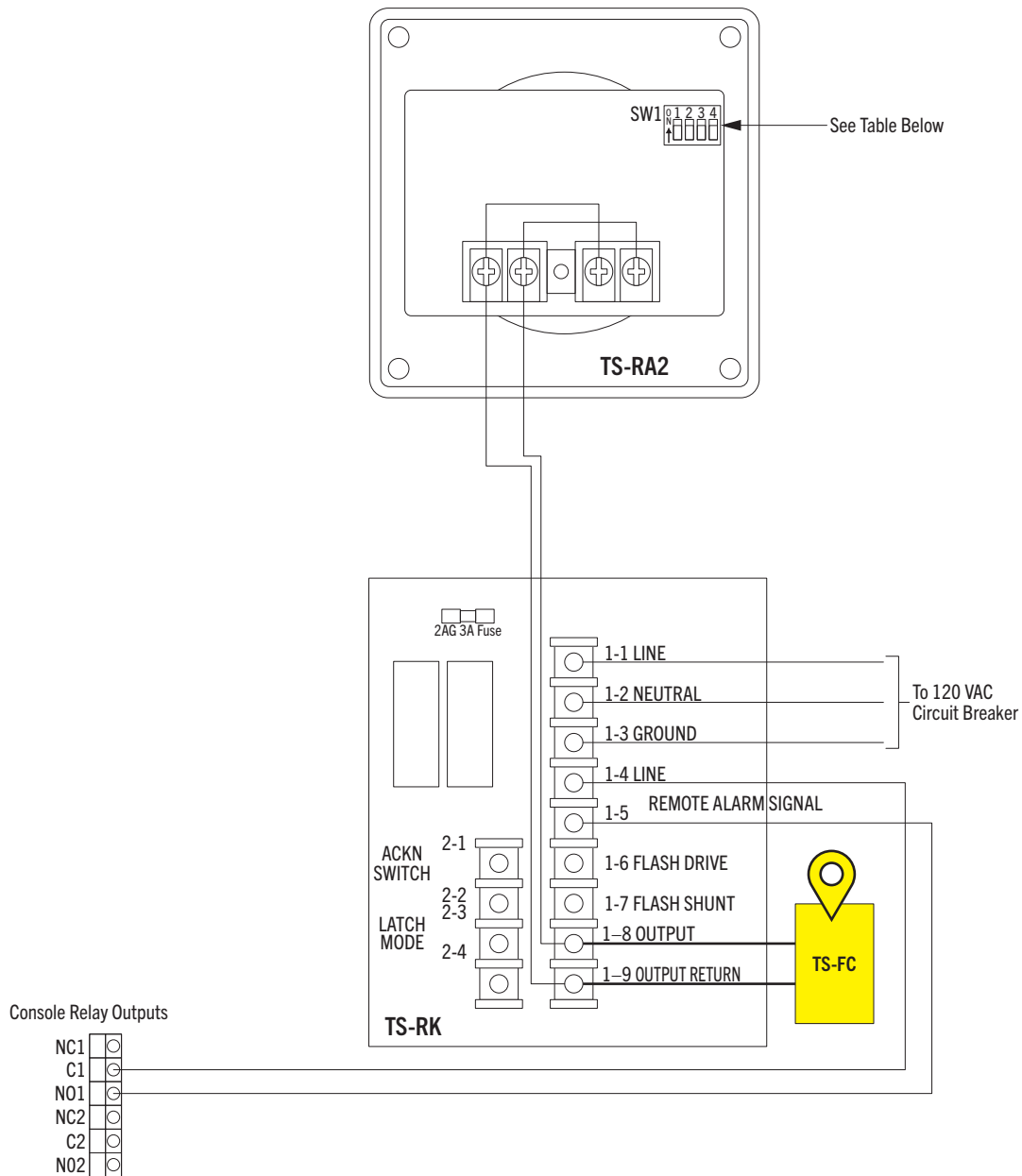


Table 4.1 – TS-RA2 SW1 Switch Position Settings (factory settings are shown in **bold**)

Sound Output Level	Position 1	Tone	Pos. 2	Pos. 3	Pos. 4
High dB	ON	Horn (continuous)	ON	ON	ON
Standard db	OFF	Bell	ON	OFF	ON
		March Time Horn	OFF	OFF	ON
		Code-3 Horn	ON	ON	OFF
		Code-3 Tone	OFF	ON	ON
		Slow Whoop	OFF	ON	OFF
		Siren	ON	OFF	OFF
		HI/LO	OFF	OFF	OFF

4.2 Setup And Operation

4.2.1 EVO™ ONE, EVO™ 200 / 400 & EVO™ 600 / 6000

4.2.1.1 Relays

■ Group	Parameter Name	Parameter Value
☐ Relays		
☐ Overfill Alarm	Name	Overfill Alarm
	Connection Type	» Select the connection type of the relay » Power Supply Module (EVO™ 600/6000) » Relay Module (EVO™ 600/6000) » Internal Relay (EVO™ 200/400)
	Module	» Select which module the relay is connected to.
	Channel/Relay #	» Select which channel the relay is connected to.
	Enabled	Yes

4.2.1.2 Logic Conditions

■ Group	Parameter Name	Parameter Value
☐ Logic Conditions		
☐ Overfill Alarm*	Name	Overfill Alarm
	Enabled	Yes
☐ User Inputs		
☐ Conditions		
☐ High product or High high product	Name	High product or High high product
	Description	---
	Type	Logic
	Logic Operator	AND
☐ Inputs		
☐ Input 1	Input Type	Event Occurred (Transient)
	ID Type	Tank
	ID	Any
	Event Priority	Alarm
	Event Code	High product or High high product
	Invert Input	No
☐ Outputs		
☐ Condition Output	Invert Input	No
	Input Condition	High product or High high product
	Type	Relay
	Relay	Overfill Alarm
	Action Type	Pulse
	Pulse Duration	2

4.2.2 EVO™ 550/5000

Set up the console so that the alarms operate properly:

1. Identify the relay that is being used to activate the overfill alarm equipment.
2. Navigate to the setup programming of that relay.
3. Confirm that the relay is programmed according to the following:
 - Name: Overfill Alarm Relay (or similar).
 - Enabled: Yes
 - Type: Alarm
 - Polarity: Normal
 - Logic: OR Logic
 - Physically Wired As: Normally Open
 - Number of inputs: 0

NOTE: If it is a legacy console, refer to the associated programming manuals for specific information.

4. Make sure the rule activates the overfill alarm equipment when a HIGH or HIGH HIGH tank alarm occurs. Go to the Rules section of programming:
 - Rule: Overfill Alarm Activate (or similar)
 - Name: Overfill Alarm Activate (or similar)
 - Enabled: Yes
 - Events
 - Event: Type Alarm Occurred
 - Category: FMS
 - Device: Tank
 - Device ID: Any
 - Code: High product level or High High product level

Actions

- Action Type: Relay
- Module: Power Supply Module or Relay Module
- Channel: Overfill Alarm Relay
- Action: One Pulse
- Duration: 2

NOTE:

- Legacy consoles that do not have the One Pulse option must incorporate two separate actions. The first action to activate the relay and the second action to deactivate the relay.
 - Verify that the code selected sounds the alarm at the correct volume/limit set for each tank.
 - Verify that the code selected refers to the correct High High or High product threshold. Confirm the units in which the High and High High thresholds are measured under Fuel Management Systems/High Product Limit.
5. Force the tank into the High or High High Alarm by manually raising the product float beyond the threshold and confirming the overfill alarm sounds. Press the acknowledge button on the TS-RK to silence the alarm.

4.3 Testing The System

4.3.1 Testing The Alarm Wiring

Use the following procedure to verify that the tank overflow alarm is wired correctly. If the Setup and Operation procedure does not produce an overflow alarm, use the following procedure to verify that the issue is not caused by improper wiring.

1. From the Web Browser Interface, navigate to Tools > Test Operations on the EVO™ 200/400/600/6000 or navigate to System > Diagnostic > Relay status on the EVO™ 550/5000.
2. Select the Toggle Relay Active for the EVO™ 200/400/600/6000 or the Activate/Deactivate checkbox for the overflow alarm relay on the EVO™ 550/5000.
3. Check to see if the overflow alarm is activated.
 - a. If the overflow alarm is activated, the wiring is correct. Select the Toggle Relay Active or clear the overflow alarm relay checkbox to deactivate the relay. Press the acknowledgment button on the TS-RK to silence the alarm.
 - b. If the overflow alarm is not activated, there is an issue with the wiring. Clear the overflow alarm relay checkbox to deactivate the relay. Consult §3.2.1 and §4.1.2 for information about proper wiring.

NOTE: If you have a legacy console, refer to the associated programming manuals for information about manually activating relays.

4.3.2 Testing The Remote Alarm

Use the following procedure to verify that the tank overfill alarm is operating correctly.

1. Remove the probe.
2. Carefully remove the probe dust cap.
NOTE: Tanks are typically under pressure or vacuum and once the cap is removed, a rush of air will likely be present to equalize tank pressure.
3. Slowly raise the probe by carefully pulling on the yellow quick disconnect cable.
NOTE: While removing the probe, carefully guide floats through riser to avoid damage and prevent the probe from catching on the riser.
4. Once the probe and floats have cleared the riser, hold the probe with two hands along the shaft and carefully lower it to lay flat on the forecourt surface.
IMPORTANT:
 - DO NOT allow probe to roll.
 - DO NOT place probe in an area of foot or vehicle traffic.
5. Clean up any fuel drips or spill from the probe.
6. Slowly raise the product float towards the probe head until the remote alarm sounds.
 - a. Confirm a High Product or High High Product Alarm, depending on configuration settings, for the corresponding tank has posted on the ATG.
 - b. Acknowledge the alarm by depressing the button on the alarm acknowledgment unit.
NOTE: Once the alarm acknowledgment unit has been depressed, the latching relay is released and the overfill alarm/Remote Acknowledgement is now prepared to reinitiate overfill alarm in the case another tank experiences an overfill situation.
7. Repeat steps 1 – 3 for each tank.
8. Once the required testing of the probe/ overfill alarm has been completed, reinstall the probe per the probe installation guide. *Confirm the probe is reading measurements correctly and that no alarms are active on the console.*

5 Troubleshooting

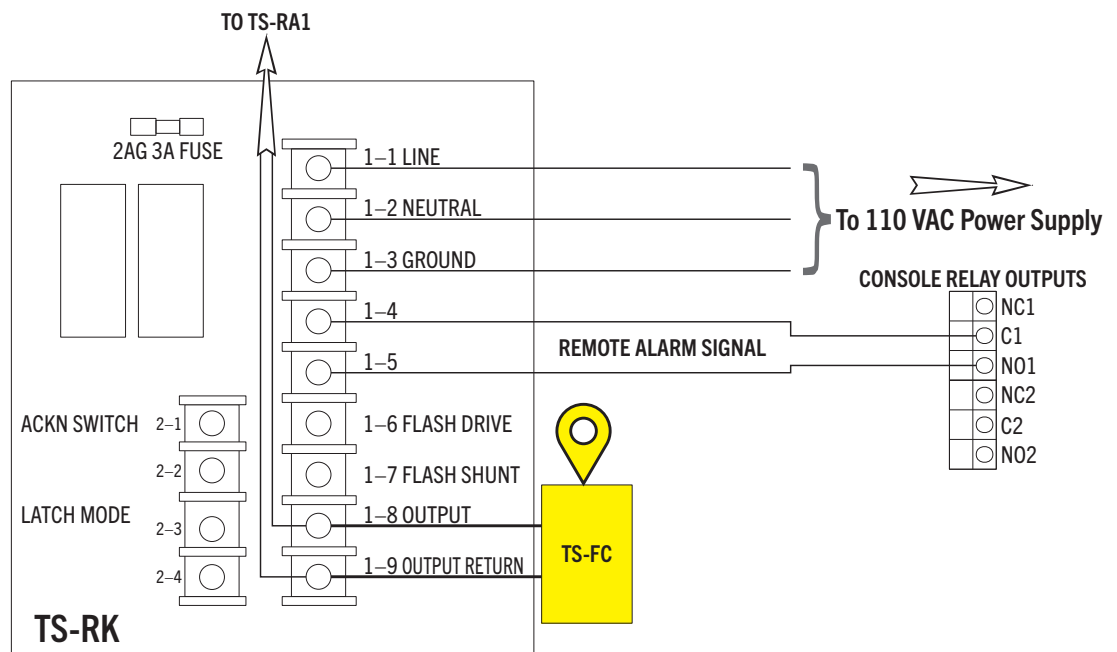
If a TS-RA1 unit is experiencing an issue where a continual humming sound is being emitted, it is likely the result of a bleeding current through the resistor – capacitor circuit.

Troubleshooting Method

1. Examine the TS-RK and TS-RA1 for corrosion within the units. *If corrosion is present, the units should be replaced and new ones should be installed in a manner that will now allow for ANY water ingress.*
2. If corrosion is not evident, ordering and connecting a TS-FC filter capacitor to the system may help.

NOTE: Newer TS-RK units ship with TS-FC filter capacitors (📍) that are to be installed on 1-8 and 1-9.

3. Connect the TS-FC filter capacitor in parallel with two wires that go from TS-RK to TS-RA1 between terminals 1–8 and 1–9.



Issue Prevention

1. Ensure the TS-RK is powered from its own dedicated breaker.
2. Ensure the TS-RK and TS-RA1 units are installed in a manner that will not allow for ANY water ingress.

6 Appendix

6.1 Related Documents

Documentation can be found online at www.franklinfueling.com.

Part Number	Description
000-2142	Fuel Management System Programming Guide
000-2150	Fuel Management System Installation Guide
000-2173	EVO™ 550 Programming
000-2170	EVO™ 550 Installation
000-2153	Colibri® Automatic tank Gauge Installation Guide
000-2155	Colibri® Set-Up and Operation Guide
TB0824-01	TS-RK and TS-RA1 Troubleshooting

