Franklin Fueling Systems

INCON®

TS-ROM2

Installation and Programming Guide

Franklin Fueling Systems • 3760 Marsh Rd. • Madison, WI 53718 USA
Tel: +1 608 838 8786 • 800 225 9787 • Fax: +1 608 838 6433 • www.franklinfueling.com

Contents

Preface

The TS-ROM2 (Tank Sentinel - Relay Output Module) is designed for use with the TS-1001, TS-2001, TS-504 and TS-508 Automatic Tank Gauge (ATG) console and up to eight product dispenser pump relays. The TS-ROM2 is primarily designed and configured to turn off (open) the power source to a dispenser pump relay or dispenser solenoid valve whenever an assigned product or tank alarm condition is sensed and received at the ATG (i.e.. high product levels, low product levels, high water levels and tank point sensor alarms). Opening the pump relay circuit will inhibit product dispensing. In addition, the ATG/TS-ROM2 module can be programmed to override the product dispensing inhibitor for an assigned length of time; this grace period can range from 0 to 120 minutes. The TS-ROM2 was alternatively designed to be easily reconfigured and to **turn on** or **off** other devices, whenever an assigned product or tank alarm condition is sensed and received at the ATG console.

Abbreviations and Acronyms

ATG - Automated Tank Gauge
NC - Normally Closed
NO - Normally Open
TS-ROM - Tank Sentinel-Relay Output Module
UPS - Uninterruptible Power Supply
UST - Underground Storage Tank

Contacting INCON

Please feel free to contact us by mail at: Franklin Fueling Systems, 3760 Marsh Rd., Madison, WI 53718 USA.

Or contact us by phone, fax, or email:

Tel: +1 800 225 9787 **E-mail:** sales@franklinfueling.com
Fax: +1 608 838 6433 techserve@franklinfueling.com
International Tel: Mexico 001 800 738 7610

Office Hours: 8am to 5pm CST - Monday through Friday

Please visit our web site at www.franklinfueling.com

Important Safety Messages

INCON equipment is designed to be installed in association with volatile hydrocarbon liquids such as gasoline and diesel fuel. Installing or working on this equipment means working in an environment in which these highly flammable liquids may be present. Working in such a hazardous environment presents a risk of severe injury or death if these instructions and standard industry practices are not followed. Read and follow all instructions thoroughly before installing or working on this, or any other related, equipment.

As you read this guide, please be aware of the following symbols and their meanings.

Warning This symbol identifies a warning. A warning sign will appear in the text of this document when a potentially hazardous situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of severe bodily harm or even death.

Caution This is a caution symbol. A caution sign will appear in the text of this document when a potentially hazardous environmental situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous environmental situation may involve the leakage of fuel from equipment that could severely harm the environment.

Warning **Follow all applicable codes governing the installation and servicing of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and any 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 powered on during installation or servicing. Please refer to the *Installation and Owner's Manual* for this equipment and the appropriate documentation for any other related equipment, for complete installation and safety information.**

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 manual is usually mounted underground, so reduced visibility puts service personnel working on this equipment in danger from moving vehicles entering the work area. To help eliminate these unsafe conditions, secure the area by using a service truck to block access to the work environment, or by using any other reasonable means available to ensure the safety of service personnel.**

Warning **All wiring must enter the Tank Sentinel® enclosure through the non-intrinsically safe knockouts as shown in Figure 1. An explosion hazard may result if other openings are used.**

Warning **Refer to console installation and wiring as described in the *Tank Sentinel® Installation Guide* (P/N 000-1050), and the programming instructions as described in the *Tank Sentinel® Setup Programming Guide* (P/N 000-1053). Read and understand all manuals, including this one, before proceeding with installation. The recommended hardware and information presented in this guide is particular to the TS-ROM2 (Relay Output Module). Any other required hardware not listed here is listed in the *TS-1000 Installation Guide*.**

Notice

INCON reserves the right to change this document and specifications at any time without notice. INCON makes no expressed or implied warranty with regard to the contents of this manual. INCON assumes no liability for errors or omissions, or for any damages, direct or consequential, that result from the use of this document or the equipment that it describes.

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General Information

Specification Information

The TS-ROM2 BriteBox™ is either a four channel (TS-ROM2/4) or eight channel (TS-ROM2/8) programmable, dry-relay-contact, output control device. The states of the channel relays and contacts can be programmed to change in response to the occurrence of alarms. The electronics are housed in an enclosure which is approximately 7 inches high, 5 inches wide and 3 inches deep. The four enclosure mounting holes will accept #8 fasteners.

The TS-ROM2 (Relay Output Module) is provided with an 18 inch (max. length) BriteBus™ serial interface ribbon cable (P/N 600-0052) which is internally connected to J1. Terminal Strip J10 has sixteen output terminals which are divided into two output (**OUT n**) terminals per channel. Each **OUT n** channel has one output terminal in series with the channel relay's **- C** (common) contact, and the other output terminal is in series with its 3 Amp output channel fuse and either the NO (normally open) or NC (normally closed) relay contact. The position of the output channel fuse determines the de-energized relay's NO or NC contact selection. In addition, each output channel has a relay on/off status LED. Finally, the TS-ROM2 is provided with an "active on/active off" switch (SW1: 1-8) that allows a channel relay to be energized in either an **alarm** (active switch: off) or **no-alarm** (active switch: on) condition.

Up to four 1/2 or 3/4 inch knockouts can be used for the TS-ROM2's conduit wiring. Do NOT use the *top and lower side* conduit knockouts because of space limitations. Jack J2 and the knockout closest to J2 is reserved for the addition of another BriteBox accessory module. In addition, a spare fuse (BUSS PN: PCC3/INCON PN: 430-0033) is provided and comes in a seperate, clear plastic bag.

One end of the ribbon cable connector mates to J1 at the TS-ROM2 module, and the other end will connect to J1 at the ATG console after it has been "pulled" through 3/4 inch flexible conduit. The dispenser pump relay coil wiring, and the dispenser pump switch wiring, will enter through a conduit at one, or both, of the two 1/2 or 3/4 inch knockouts provided at the bottom of the TS-ROM2 enclosure. Either of the two relay output channel terminals can be wired to the dispenser pump relay coil, and the other remaining relay output channel terminal is wired to the dispenser pump switch (refer to Figure 1).

The TS-ROM2 has an operating temperature rating of 32° to 131° F (0° to 55° C). Each dry-relay-contact output channel is fused and is rated for 3 Amps at 250 VAC/1 Amp at 30 VDC.

Note: The TS-ROM2 is shipped in a standard configuration: all channel relays are energized (turned on) during normal no-alarm conditions, all "active on/active off" switches **(SW1: 1-8)** are OFF and all output channel fuses are inserted in the **FnNO (F**use channel **#n N**ormally **O**pen) relay contact position.

Theory of Operation (Standard Configuration)

Serial communication data, logic power and ground are supplied through the BriteBus ribbon cable. During normal no-alarm conditions (when no product or tank point alarms exist) the data will turn on all of the channel's relays and relay status LEDs. While the dispenser pump relay circuit is complete, the dispenser pump is permitted to operate. **If the Tank Sentinel loses power, then all of the channel relays will return to, and remain in, their normal de-energized state until power is recovered.**

If the ATG console receives a tank or point alarm fault signal that has been assigned to control the TS-ROM2 outputs, then the serial data will selectively turn off the affected channel relays and LEDs. The channel relay contact will open, creating an open dispenser pump relay-coil circuit. In turn, the dispenser pump relay will drop out, its contacts will open the dispenser pump power source circuit and the dispenser pump will be inhibited from operating. The dispenser pump will be disabled from further operation until the fault condition has been corrected. Pressing the **ACK** key will allow for a permissive-product-dispensing grace period only if a **GRACE PERIOD** has been programmed. Also see the Alternate Uses and Configurations section of this manual for further information.

Installation Overview

This installation is to be performed in the following sequence:

1. Turn power off
2. Mechanical installation
3. Electrical installation
4. Power up
5. Programming the Tank Sentinel console for proper operation of the TS-ROM2
6. Testing The TS-ROM2 for proper operation

Required Materials

- 3/4 inch flexible conduit (11" maximum length)
- 3/4 inch rigid metal conduit (A/R)
- (Optional) 1/2 inch rigid metal conduit (A/R)
- Conduit fittings and conduit clamps
- (4) Appropriate #8 fasteners for mounting the TS-ROM2 enclosure

Required Wire Type and Insulation Color

Type THHN, TFFN or THWN: 18 to 12 AWG (min/max), color per codes.

Installation

Mechanical Installation

1. Remove the TS-ROM2's front cover. Observe the four #8 mounting holes directly below the cover's four threaded hold-down screw holes.
2. Position the TS-ROM2 no greater than 11 inches to the left of the ATG console. Position the TS-ROM2 enclosure so that its upper right conduit fittings and the ATG's upper left conduit fittings are aligned.
3. Locate and mark the four TS-ROM2 fastener positions. Remove the 3/4 inch knockout from the TS-ROM2 and ATG console as indicated in Figure 1.
4. Install a 11 inch (maximum length) piece of 3/4 inch flexible conduit between the two enclosures and fasten the TS-ROM2 module using four appropriate #8 fasteners. Pull the BriteBus ribbon cable through the conduit and connect it to J1 at the ATG console. The red stripe of the ribbon cable should be facing down on the TS-ROM2 and ATG connectors as indicated in Figure 1.
5. Plan the installation and routing of a 3/4" or 1/2" metallic conduit from one, or both, of the bottom conduit knockouts provided in the TS-ROM2 enclosure to the dispenser pump relays. Also, route conduit from the TS-ROM2 enclosure to the dispenser pump switch.

Electrical Installation

1. For each dispenser pump output channel (**OUT n**) used, run one conductor from either of the two relay output channel terminals to the dispenser pump switch, and run one conductor from the other remaining relay output channel terminal to the pump relay-coil (Line Voltage) terminal. Leave a service loop at both ends (refer to Figure 1).

Note: Maintain a consistent wire color code to avoid wiring errors and circuit, or equipment, damage.

2. Mark each output channel wire with a: power feed description, circuit # and power source circuit breaker-panel identifier (i.e. **OUT 1: DISPENSER PUMP 1, CKT #121, Circuit Breaker #2A-8**).
3. Wiring from the dispenser pump relay power source to the dispenser pump switch and from the pump relay power source neutral bus to the pump relay neutral terminal will remain unchanged, and will be identical to other manufacturer's instructions.
4. Fill in the Channel Output Pump Relay and Tank Assignments in Table 2 after each output wiring has been completed.

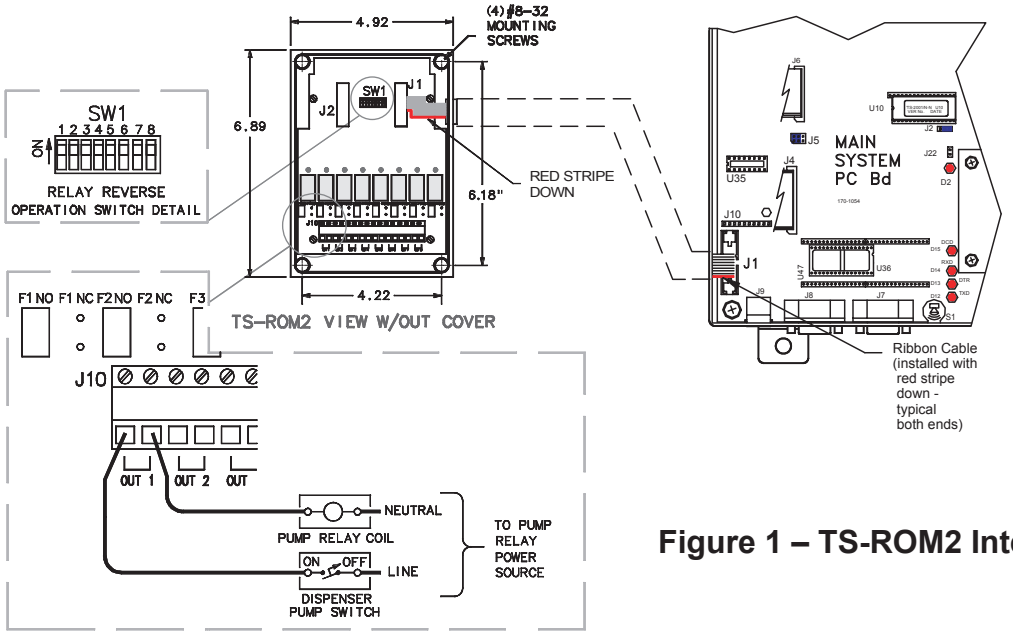

Figure 1 – TS-ROM2 Interface

Finishing the Installation

1. Carefully recheck that all wiring is terminated securely and accurately.
2. Make sure that all of the conduit fittings and covers are in place and fastened.
3. Make sure that the ATG console's conduit fittings and Intrinsically Safe (I.S.) terminal guards are in place and are secured. Also make certain that the ATG console's internal power switch (SW1) is ON.
4. Close and secure the ATG consoles's front panel cover and any other equipment/devices involved in this installation. The TS-ROM2's cover will be installed after testing is completed.

Power Up

1. Turn the ATG's AC line power circuit breaker back on at the power source panel.
2. Turn any other equipment/devices (i.e. dispenser pump switch) AC line power circuit breaker back on at the power source panel.
3. With no tank or point alarms, verify that the TS-ROM2 output channel relay status LEDs are on.

Programming

Prior to programming the TS-ROM2's control outputs**,** the ATG must be programmed so that it can accurately recognize and respond to your system's: unique mix of hardware, management procedures and communications setup. Please refer to the *Tank Sentinel Setup Programming Guide* (P/N 000-1053) for complete system programming setup instructions.

Alternate Uses and Configurations (Example)

Since the TS-ROM2 is provided with either four or eight relay output channels and the ATG can monitor up to four USTs (Underground Storage Tanks), you may have extra relay output channels available. These extra relay output channels can be used to enable/disable (turn On/Off) other devices in addition to controlling product dispenser pumps.

Table 1 – Example: Tank Sentinel or ATG Relay Output Assignments

TS-ROM2: Channel Output No. & Relay Contact Selection, Dispenser Pump Relay No., Tank No. and Output Control (Alarm Assignments)

Output Channel # & (Relay Contact)	Circuit or Device Description	Pump Relay No.	Tank No.
OUT 1 (NO): @	Dispenser Pump	1	1
OUT 2 (NO): @	Dispenser Pump	2	2
OUT 3 (NC): @	Tank Leak Light	—	1 & 2
OUT 4 (NO): !	Sump High Light	—	2

Note: @ = SW1-n Active OFF, and ! = SW1-n Active ON

Refer to Table 1 above: Three outputs are configured in Active OFF mode (SW 1: -1, -2, & -3 = OFF **@**) and one output is configured in the Active ON Mode (SW 1: -4 = ON !). In addition, one output channel fuse is installed in the normally closed contact position **(F3NC)** and all other fuses are in the normally open **(FnNO)** contact position.

Relay & LED Truth Table

Relay Contact and Fuse (Channel N) Position:	w/o alarms		with alarms		X = ON/Closed O = OFF/Open
	FnNO	FnNC	FnNO	FnNC	
@ Active OFF Configuration	X	O	O	X	(SW1-n OFF)
! Active ON Configuration	O	X	X	O	(SW1-n ON)

Note: The Table 1 example, and this discussion, do not cover all possible uses of, or assignments to, the TS-ROM2.

Active Off Mode, NO-Contact Configuration

While no alarms exist, the output channels' relay and relay status LED indicators will be *on*, and the **NO** (normally open) relay contacts will be *held closed*. The example above shows Tank 1 and Tank 2 relay outputs setup for product dispenser pump - disable circuits. The LOW LOW product level limit alarms, and high WATER LIMIT level alarms have been assigned to CONTROL the output channels. If a LOW LOW or a WATER LIM alarm fault occurs, then the assigned outputs will turn off, and the previously held closed **NO** relay contact will open *disabling product dispensing*.

Active Off Mode, NC-Contact Configuration

While no alarms exist, the output channels' relay and relay status LED indicators will be *on*, and the **NC** (normally closed) relay contacts will be *held open*. The example above shows Point 1, Point 2, and Point 3 relay outputs have been setup for a "Tank Leak Indicator" circuit. Point 1, Point 2, and Point 3 alarms have been assigned to CONTROL output channel number 3. If any of these point fault-alarm occurs, then the assigned output No. 3 will turn off, and the previously held open **NC** relay contact will close and supply power to the "Tank Leak Indicator".

Active On Mode, NO-Contact Configuration

While no alarms exist, the output channels' relay and relay status LED indicators will be *off*, and the **NO** (normally open) relay contacts will be *open*. The example above shows Point 4 relay output setup for a tank 2 "Sump High Level Indicator" circuit. Point 4 alarm has been assigned to CONTROL output channel number 4. If a Sump 2 High Point fault-alarm occurs, then the assigned output No. 4 will turn on, and the previously open **NO** relay contact will close and supply power to the "Sump High - Level Indicator".

Testing the TS-ROM2

After the TS-ROM2 is installed and programed, test all of the point sensors and tank Liquid Level probes to make sure that they are operating properly with the TS-ROM2. Verify all functions according to your programming and jumper settings. All new Tank Sentinel systems and new point sensors must be tested.

Note: If your ATG (except for the TS-750) does not automatically recognize your TS-ROM2, please contact Technical Support.

Table 2

TS-ROM2: Channel Output & Relay Contact Selection, Dispenser Pump Relay No., Tank No. and Output Control (alarm assignments)										
Output Channel # & (Relay Contact)	Circuit or Device Description	Pump Relay No.	Tank No.	Output Control (Alarm Assignments)- Disable/Enable: Output Channel No.						
				Point CNTL (Point Sensor-Alarm)	LO CNTL	LO LO CNTL	HIGH CNTL	HIGH HIGH CNTL	WATER CNTL	SYSFAIL CNTL
OUT 1 ( )										
OUT 2 ( )										
OUT 3 ( )										
OUT 4 ( )										
OUT 5 ( )										
OUT 6 ( )										
OUT 7 ( )										
OUT 8 ( )										

Note: @ = SW1-n Active OFF, and ! = SW1-n Active ON

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3760 Marsh Road ● Madison, WI 53718 U.S.A.
Tel: +1 608 838 8786 ● Fax: +1 608 838 6433 ● www.franklinfueling.com
Tel: USA & Canada 1 800 225 9787 ● Tel: Mexico 001 800 738 7610