

***Liquip/Civacon ROM III
Overfill Detection & Retained Product
Monitor (Left-to-Right)
Model Series: 3308-LIQ & 3308R-LIQ
Installation & Operations Manual***

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1. Product Description

This manual will help you understand how to safely operate and install ROM III; a Retain Product and Overfill Monitor system that can be mounted on a tank or trailer. If you have any questions regarding this product or the content of this manual, our technical support team will be glad to assist.

The ROM III can monitor industry standard top and bottom 2-wire optic sensors for up to 8 compartments. It provides a choice of 5-wire optic, 2-wire optic/thermistor or float petroleum signal outputs. These signals can be routed via the standard 10-pin gantry socket/plug interface to communicate pending overfill or, retain product conditions to any EN13922 or API RP1004 compliant rack monitors.

The ROM III includes a non-intrinsically safe relay output which can be used to switch a solenoid valve or heavy-duty automotive relay. This allows the ROM III to control loading when a terminal rack monitor is not involved.

Three auxiliary intrinsically safe inputs are provided. These are intended to be connected to simple control switches and are interlocked with the ROM III overfill permissive state.

One intrinsically safe auxiliary output is provided to allow multiple ROM III to be cascaded. The operation of this intrinsically safe output is dependent on the top sensor overfill status.

MODELS of ROM III Include:

- #3308-LIQ – Liquip Branded ROM III, with Left-to-Right Reading LEDs
- #3308R-LIQ – Liquip Branded ROM III, for Retained Reset Switch, with Left-to-Right Reading LEDs

Ordering Information

- LIQ3308-LIQ: ROM III OBM
- LIQ1910A: 2 channel ROM III terminator
- LIQ3308-LIQZ: Kit comprises of ROM III OBM + 1910A terminator

2. General Specifications

Parameter	Minimum	Maximum	Units
Input Voltage	9	30	VDC
Input Current		1	A
Ambient Operating Range	-40°	+70°	Celsius
Storage Temperature	-40°	+70°	Celsius
Max. Surface Temperature		+135°	Celsius
NON I.S. Relay (TB1) Voltage		30	V
NON I.S. (TB1) Relay Current		5	A
I.S Aux Out (TB4) Voltage		20	V
I.S Aux Out (TB4) Current		50	mA
Altitude		2000	M
Humidity		100%	

The ROM III is rated for outdoor use having an overvoltage category code I and pollution degree 2 according to UL 61010-1 standard.

3. Intrinsic Safe Specifications

This section is agency controlled, hence shall not be changed without permission of agency.

The ROM III has been assessed by compliance with the following documents:

EN IEC 60079-0: 2018

EN 60079-11: 2012

EN 60079-15: 2010

Equipment Label Marking:

ROM III		CIVA CON 	VMAX : 30VDC === IMAX : 1.0A	
MODEL: 3308-3308		9393 Princeton Glendale Rd, Hamilton, Ohio 45011 U.S.A.		
<p>WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT. AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE. NE PAS OUVRIR UNE ATMOSPHERE EXPLOSIVE EST PRESENTE.</p>		FM18CA0016X IECEX FMG 180004X FM18ATEX0015X		
<p>THIS ENCLOSURE IS A POTENTIAL ELECTROSTATIC HAZARD. TO PREVENT THE RISK OF ELECTROSTATIC SPARKING, THE SURFACE SHOULD ONLY BE CLEANED WITH A DAMP CLOTH. CL I, DIV 2, GPS C & D T4 PROVIDING INTRINSICALLY SAFE CONNECTIONS FOR CL I, DIV 1, GPS C & D CL I, ZONE 2 AEx / Ex nA [Ia Ga] IIB T4 Gc</p>		  II 3(1) G Ex nA [Ia Ga] IIB T4 Gc Ta = -40°C to +70°C INSTALL PER CONTROL DRAWING CD3308		

MODEL: 1910A	
	CL I DIV 2, GP, C & D T4 WHEN CONNECTED PER CONTROL DWG CD3308
FM18CA0016X IECEX FMG 180004X FM18ATEX0015X	-40°C ≤ T _{amb} ≤ +70°C
 	II 3(1) G Ex nA [Ia Ga] IIB T4 Gc
	INSTALL PER CONTROL DRAWING CD3308
CIVA CON 	
9393 PRINCETON GLENDALE RD. - HAMILTON, OH 45011 USA	

Description of Equipment or Protective System:

General - The ROM III is a tank/trailer mounted On Board Monitoring (OBM) system providing intrinsically safe connections for sensors mounted in the top and bottom of each tank compartment. The ROM III monitor detects and communicates the sensor status and overall unit's "permissive to load" (the tanker) status to a loading rack monitor via its socket outputs. The ROM III is powered by connection to the truck battery. The Model #1910A ROM Terminator is used to terminate the unused sensor input circuits.

Construction - The monitor is housed in a rectangular aluminum box enclosure with seven $\frac{1}{2}$ NPT threaded entries and a windowed cover held in place by six bolts. There are two circuit boards (Base board and Top board), the boards are encapsulated with only the wiring terminals and signal LEDs protruding from the encapsulation. The input terminals are separated from the intrinsically safe terminals by a metal partition. Unused top or bottom sensor input circuits should be terminated with the Model #1910A ROM terminator probe. This is typically installed inside the ROM III enclosure alongside TB2 terminals.

Ratings - The ROM III operating voltage is 9 – 30 Vdc, 1A. The ROM III is rated for use in an ambient temperature range of -40°C to $+70^{\circ}\text{C}$.

Entity Parameters: TB2

U_o (Voc) = 11.8V, I_o (Isc) = 36.2mA, P_o = 110mW, C_o (Ca) = 400nF, L_o (La) = 3.8mH
 V_t = 11.8 V, I_t = 185 mA, P_o = 0.546W, C_o (Ca) = 400nF, L_o (La) = 3.8mH

Entity Parameters: TB3 (only one type connection can be used at one time)

Float Connections: U_i (VMAX) = 20V, I_i (IMAX) = 750mA, P_i = 1.0W, C_i = 0uF, L_i = 0mH
Therm Connections: U_i (VMAX) = 20V, I_i (IMAX) = 750mA, P_i = 1.0W, C_i = 0uF, L_i = 0mH
Optic Connections: U_i (VMAX) = 20V, I_i (IMAX) = 750mA, P_i = 1.0W, C_i = 0uF, L_i = 0mH

Entity Parameters: TB4

AUX 1, 2, 3: U_o (Voc) = 30 V, I_o (Isc) = 2.5mA, P_o = 19 mW, C_o (Ca) = 400nF, L_o (La) = 1.9H
AUX 1, 2, 3: V_t = 30 V, I_t = 7.5 mA, P_o = 0.546W, C_a = 400nF, L_a = 1.9H
AUX OUT: VMAX = 20 V, IMAX = 50mA, C_i = 0nF, L_i = 0mH

Specific Conditions of Use:

The enclosure is a potential electrostatic hazard. To prevent the risk of electrostatic sparking, the surface should only be cleaned with a damp cloth.

4. Top Only ROM III Onboard Monitor

The ROM III monitor can be configured for top only (overfill) operation by inserting the 2-way terminal strip into terminal block (TB4A), which is located at the top right of unit. DO NOT connect anything to the retain (bottom) sensor terminals.

5. The Reset Switch

If using retain sensors you will need a reset switch. If this option is ordered the reset switch will come installed. The reset switch is to reset the 40-minute timer.

6. Mounting Instructions

6.1 Housing Mounting Instructions

The ROM III has four (4) flanges with holes, at the base of its cast aluminum housing, used for mounting the enclosure. These are provided so that it may be securely bolted to a grounded metal portion of the trailer. Locate the monitor in an area that is visible to the operator near the sockets and bottom loading adapters. The holes on the enclosure are 7/16 inch diameter. Use 8mm bolts to secure the enclosure. Refer to Figure 1 & 2 for dimensional mounting information. Mounting dimensions are given in inches. To protect the electronics in the housing, keep the monitor lid on the enclosure until you are ready to wire the monitor. The housing provides seven (7) ½" NPT access holes (refer to Figure 1 & 2). These holes provide for easy wiring access to the desired locations of the monitor. The three (3) holes on the right side of the monitor are used for wiring to the sockets and reset switch. The two (2) located on the left side of the monitor are used for wiring the 12/24 volt power and auxiliaries. The holes along the bottom are used for the overfill (top) and retain (bottom) sensors. Any holes that are not used should be properly sealed with pipe plugs, provided with the enclosure. Once the housing is installed, you are ready to remove the cover frame, gasket, and window; and begin the wiring procedure.



THE MONITOR'S MOUNTING LOCATION IS CLASSIFIED FOR USE IN A Zone 2 IIB HAZARDOUS LOCATION OR SAFE AREA.



There is only one NPT hole provided to bring the NON-intrinsically safe power wiring into the enclosure. The remaining six (6) NPT holes are used for intrinsically safe signals and wiring. This convention **MUST** be complied with!



DO NOT open when an explosive atmosphere is present
DO NOT connect a battery charger or other pulsed power supply to this monitor as this may permanently damage the monitor
DO NOT perform any welding on the tanker when power is applied to this monitor, as welding on the tanker with the monitor power on may permanently damage the monitor
DO Read through this manual before installing any equipment, both for your safety and that of your customer.

6.1.1 Housing External Ground Stud

The ROM III enclosure has an M6 external Ground Stud. This Ground Stud is used to connect an **APPROVALS REQUIRED** #14 AWG (1.5 mm²) external Ground Wire between the enclosure and Chassis Ground on the tanker. It is suggested that this wire have a Green (or Green with Yellow Stripe) for proper identification as a “chassis ground” connection. Tighten the Ground Stud Nut to 7.6 Nm.

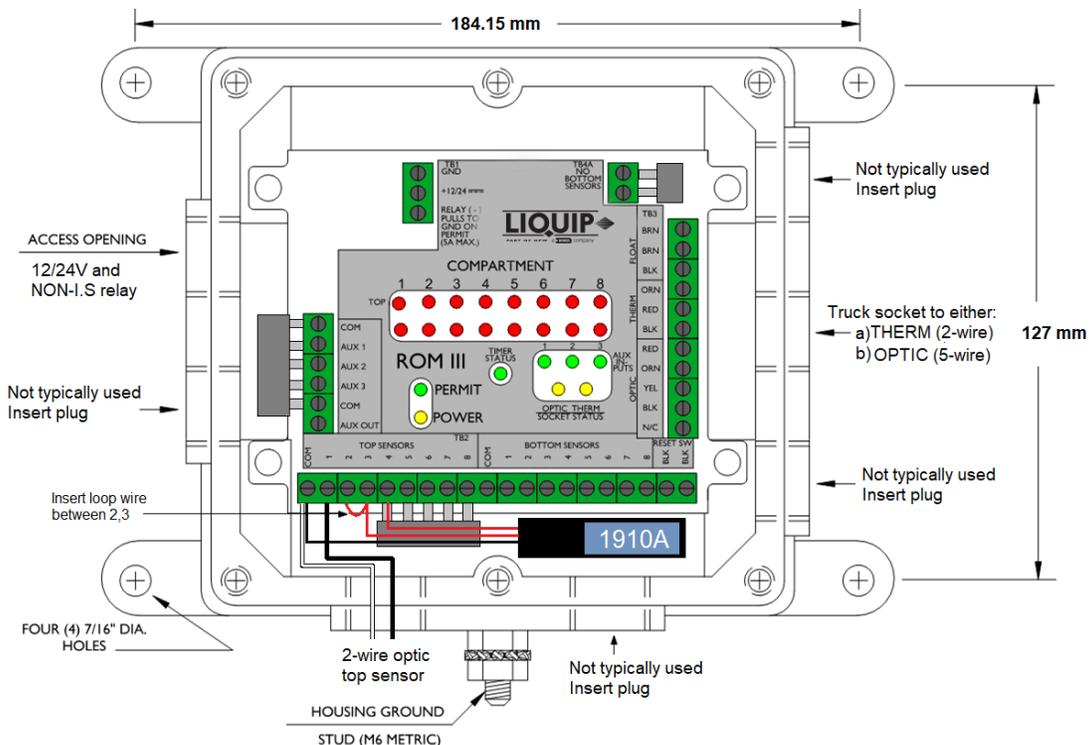
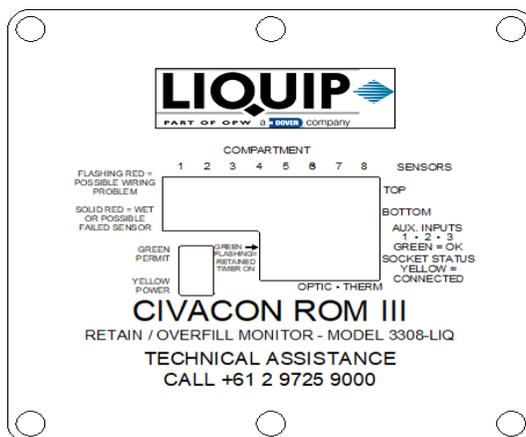


Figure 1: Mounting / Wire Entry – Models 3308-LIQ / 3308R-LIQ



Models 3308-LIQ & 3308R-LIQ
Figure 2: Front Window Graphics for “-LIQ” Versions

6.2 Module Mounting Instructions

6.2.1 Replacing Module in Older ROM II Housing

Remove the old module place the 4 standoffs that came with the 3358-3358 module in the 4 holes that the screw of the 3252-3252 came out of. Place module in the box and screw the module down.

6.2.2 Replacing a 3358-L Module

Unscrew the 4 screw and remove the module. Replace with new module and screw down the new module.

7. Wiring Instructions

7.1 The Wire

All wiring entering the monitor must enter through the appropriate access openings shown in Figure 1. Use weather tight strain reliefs or liquid-tight fittings to keep out external moisture. It is recommended that electrical cabling be high quality stranded with tinned copper wire. Terminals can accommodate 14-20 AWG (0.5-2.5mm²) gauge wires if ferrules are not fitted, or 16-20 AWG (0.5-1.5mm²) if ferrules are fitted. Cable wire insulation should be rated to at least 70 °C.

Trim about 6.5mm of insulation off the end of each wire to be connected to the terminal of the monitor. Insert the trimmed wire into its appropriate slot on the terminal and tighten the screw. Ensure that NO strands of wire have separated from the connection that could cause a potential short with an adjacent terminal. Due to the vibrations that can occur on a trailer, it is extremely important to double check all wiring connections for good mechanical integrity.

The proper color code of the wires will save time and money on the installation and on any troubleshooting, which may be required in the future. LIQUIP/CIVACON Model 2300 cable (Part # 97701) is a seven (7) conductor or Model 7215-7215 (Part # 97702) is a ten (10) conductor color coded cable which is highly recommended for use with the installation of LIQUIP/CIVACON ROM III overfill prevention equipment. LIQUIP/CIVACON also makes a Model 2100 cable (Part # 97750) that is a five (5) conductor color coded cable which may be used with the socket installations.

NOTE: The proper tightening torque value for each electrical connector screw (per the manufacturer's specifications) is 0.05 to 0.06 N-m. Please observe these values when tightening of wires into each connection terminal on ROMIII

7.2 Power



SAFETY FIRST!! POWER MUST BE OFF WHEN INSTALLING OR REMOVING POWER LEADS TO THE MONITOR. THE WIRES FOR THE POWER FROM THE BATTERY MUST BE KEPT SEPARATE FROM THE SENSOR AND SOCKET WIRING! THEY CANNOT BE RUN TOGETHER IN THE SAME CABLE! This is important to maintain safe current levels in the intrinsically safe sensors, auxiliary switches, and socket wiring.

Do not apply power to the monitor without reading this manual and thoroughly checking all connections. Measure the truck / trailer system voltage. The monitor is designed to operate from 9 to 30 Volts DC, negative ground systems, supplied by a battery. If your voltage measurement is not within this range, contact LIQUIP before installing the monitor. Power from battery chargers or other pulsed power supplies may permanently damage the monitor. If the power wires pass through a Zone1/Class I, Division 2, Group D area, the wire type must be suitable for this use.

The power supply to the ROM III should contain an inline fuse with a maximum current rating of 1/2 Amp. An inline switch located in a non-hazardous area, like the truck cabin for instance, will allow the monitor to be powered down when not in use. The wires carrying power to the ROM III should only enter the enclosure via the upper left-hand opening (refer to Figure 1).

The Relay Output at TB-1 may be used to control a solenoid valve, heavy duty automotive relay or other similar device, **mounted in a safe (ordinary / non-hazardous) area** on the vehicle.

This single output signal “pulls to ground” on Permit. It is a Non-Intrinsically Safe Relay Output Terminal (Relay Output Ground), which must not be connected to loads exceeding **30VDC, 5A Max.**

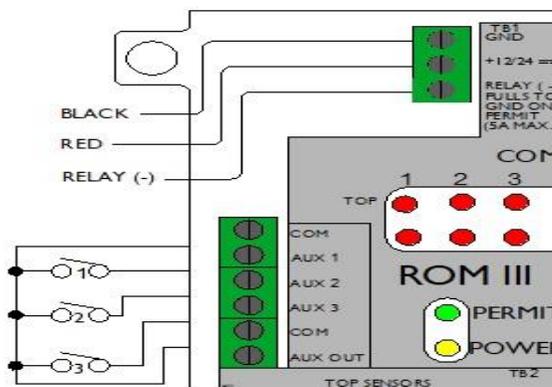


Figure 3: Power and Auxiliary Wiring

7.3 Sensors & OBM

The 2-wire optic sensor wires should enter the OBM enclosure via the proper access opening (refer to Figure 1).

Figure 4 shows wiring of a 1910A ROM terminator probe and optic probe for a 1 compartment overfill system. Note that each of the two red leads on the 1910A ROM terminator probe can be connected to up to eight sensor terminals. Typically, one red lead connects to unused TOP sensors, and the other red lead connects to unused BOTTOM sensors.

Figures 5, 6 show wiring for 6 or 8 compartment systems. The cable colors shown in are for standard Liquip/Civacon cables.

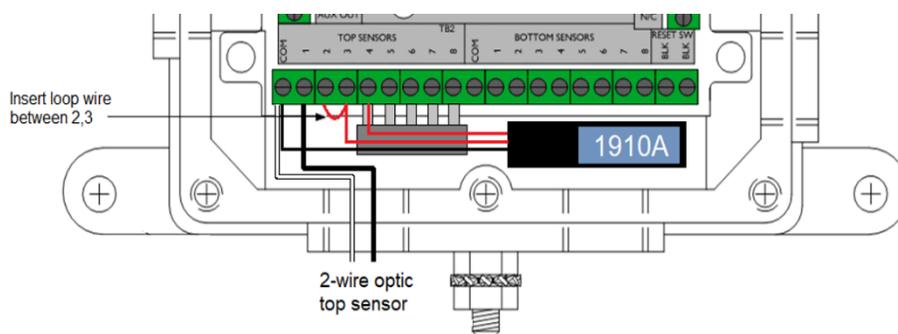


Figure 4: 1 Compartment Wiring

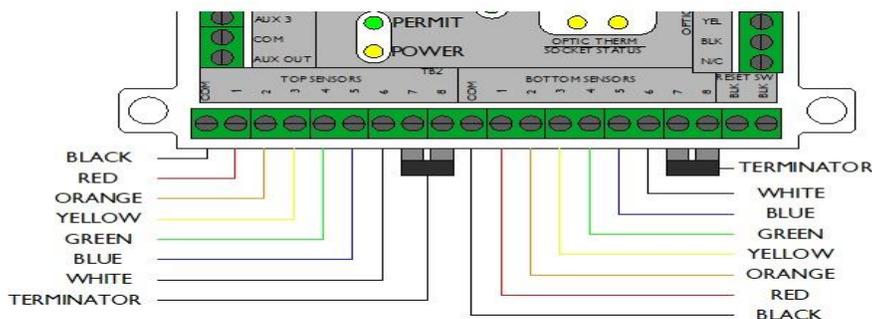


Figure 5: 6 Compartment Wiring

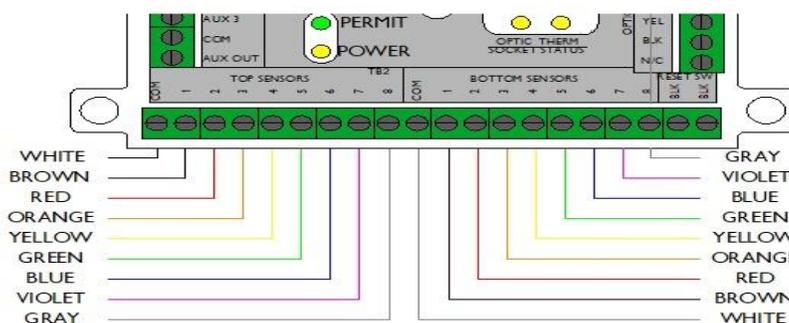


Figure 6: 8 Compartment Wiring

7.4 Auxiliary Inputs

The AUXILIARY INPUTS are three independent intrinsically safe signal sources connected to monitoring circuits. These inputs provide a voltage source that when connected to the COM common terminals, will enable the auxiliary permissive circuit. This, in addition to the normal overfill permissive circuit, controls the "PERMISSIVE" state of the module. You must have BOTH circuits permissive before any external permissive signals are given. Figure 2 shows the connections to Aux terminals, which is to the left of TB2, the sensor connections. This figure also shows the auxiliary devices as simple switches. Unused AUX inputs MUST be connected to a COM common terminal.

Please remember that these signals are intrinsically safe and cannot be run with any other wires in a cable. Only the auxiliary wires and their commons can be run together in a cable.

Any type of simple switch may be used as the switching device. These can be pressure switches which connect to the airlines to indicate a pressurized line, or an un-pressurized condition. The switch could also be a micro-switch to indicate the position of something that moves. In all cases, this switching mechanism cannot be accidentally connected to a NON-intrinsically safe voltage source.

Because of the low switching current requirement for intrinsically safe circuits, the contact material on the switching mechanism should be GOLD plated. If corrosive contact materials are used, then the integrity of the switched signal could be compromised, and not work reliably all the time. If this contact plating is not available, then the best possible material should be use, with every effort made to keep the corrosive atmospheres out of the switching chamber of the device.

Boots, sealant, junction boxes, or any means must be used to maintain the integrity of the connection to the switching device. The cables' integrity to moisture must also be maintained. Sealing the ends of the cable jacket are suggested, unless the cable enters a junction box that has strain relief fittings on it to keep the moisture outside of itself.

7.5 Sockets

Access openings are provided on the ROM III so that each type of socket has its own access connection when auxiliary inputs are not used. If the auxiliary inputs are used, use the convention shown in Figure 1. It combines the Thermistor and Float outputs into one cable exit. This convention is not required but will help in troubleshooting and tracing the system output if a problem should occur. Cross reference the LIQUIP part number of the socket to its proper wiring diagram and connect accordingly.

Strain reliefs are recommended for all cable entry locations. Note that pipe plugs are required to be installed in all of the openings which are not used for cable entry. A thread sealant is also recommended to be used with each strain relief or pipe plug.

8. Product Care

Clean product only with a damp cloth.

9. Troubleshooting Guide

9.1 Power (No Lights on Monitor or Flashing Power LED)

The monitor electronics are internally fused, and this fuse is not replaceable. It is highly recommended that a 1/2 Amp external fuse be installed in the power supply line to the monitor. Check the External Fuse first. If OK, measure the DC Voltage at TB1. If voltage is below 10.0 Vdc, the Power LED will not light.

The Power LED on the ROM III is designed to flash if the incoming power is between 10.5 Vdc and 10.0 Vdc. A flashing Power LED indicates this low voltage condition / Incoming power MUST be above 10.5 Vdc for the ROM III to operate correctly.

9.2 Auxiliary Inputs

All three of the ROM III Auxiliary Inputs MUST be lit (green) for the monitor to “permit”. Each of these inputs is a simple switch contact closure. Unused Aux. Inputs MUST be permanently jumpered to the Aux Input Common terminal. Any in-use Aux. Inputs which are not lit green can be easily tested by temporarily jumpering the unlit input terminal to Common. If the Aux. Input LED lights when this is done, the ROM III’s Input is fine and there is an external issue with this input’s wiring or control device (pressure switch, etc.). Troubleshoot accordingly.

9.3 Sensor Inputs

All of the ROM III Sensor Inputs must be satisfied with a “dry, working sensor signal” (all RED LEDs “off”) for the monitor to “permit”. Each of these Sensor Inputs will either be connected to an appropriate (actual) Sensor in one of the tanker’s compartments or will be “terminated” via an installed Model 1910A Terminator. In the case of the Retained Sensor functionality; if there are no Retained Sensors in use, these inputs can be ignored via a jumper installed in TB4A.

Troubleshooting a Sensor Input can be simplified by connecting a known good Sensor directly to the ROM III’s Sensor Input terminal (temporarily pull back the numbered wire first). If the RED Sensor LED goes out when a known good Sensor is directly attached, the ROM III’s Sensor Input is fine and there is an external issue with this input’s wiring between the monitor and Sensor atop the tanker. Troubleshoot accordingly. A flashing Red LED indicates an open wire connection in the wiring harness.

9.4 Socket Outputs

Testing of the ROM III Thermistor or Optic Socket Output requires the use of an appropriate industry “Rack (simulating) Tester”. Follow the instructions provided with the tester being used. The “THERM” or “OPTIC” LED will light on the ROM III indicating proper connection of the tester to the associated style Socket. The ROM III’s Socket Outputs will not pass testing unless the ROM III’s PERMIT LED is lit.

The ROM III’s Float Output can be easily tested with a multimeter. There will be continuity between the BRN & BRN terminals when the ROM III is permissive. Open circuit otherwise.

10. Warranty

All LIQUIP parts and products are thoroughly inspected and tested from the time the raw material is received at its plant until the product is assembled. LIQUIP guarantees that all products are free from defects in materials and workmanship for a period of one year from the date of shipment. Any product that may prove defective within said one year period will, at LIQUIP's discretion, be promptly repaired or replaced, or credit will be given for future orders. This warranty shall not apply to any product that has been altered in any way or has been repaired by any party other than an authorized service representative. The warranty shall further not apply to a product failure caused by misuse or when the product is used under conditions for which it was not expressly designed. LIQUIP shall have no liability for labor costs, freight costs, or any other costs or charges in excess of the amount of invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE.



WARNING!

LIQUIP products should be used in compliance with all applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations, compatibility with the environment, and the material to be handled.

If the product is used in a manner not specified by LIQUIP, the protection provided by the product may be impaired.

**LIQUIP MAKES NO WARRANTY OF FITNESS
FOR A PARTICULAR USE.**

11. Technical Assistance

Thank you for choosing LIQUIP for your product transportation needs. We appreciate your business and strive to provide quality customer service and support. If you need any assistance in installing your product or have further questions, please contact us at the following numbers:

Technical Assistance in the Australia/NZ.

If at any time during the installation a question arises that is not covered in this Installation Instruction, or with any other applicable documents referenced, feel free to call the

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Dear Customer:

We've developed this manual to help you with your everyday ROM III needs. We hope you'll find this manual both helpful and easy to use.

We appreciate any feedback you can provide to make this manual better for the user. Whether we didn't make something as clear as we thought, or even if something is misspelled, please let us know so we can continuously improve the quality of this manual. Naturally, we would also like to hear from you on the things you like! Please address your comments to our technical support team.

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