

RLM4-Mechanical

Remote Line Monitor

Installation Guide





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RLM4 Installation Guide

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REMOTE LINE MONITOR

Purpose of This Document

This manual contains instructions for installation of the Remote Line Monitor systems used to monitor transactions between dispensers and the consoles that control them.

Instructions for installing or servicing dispensers, consoles and tank monitors are not included in this manual. For more detail on any product not manufactured by PIE, always refer to that product's accompanying documentation.

Notice

Progressive International Electronics reserves the right to revise and improve this document as required. This publication details our Remote Line Monitors at this time, and may not accurately describe these products at all times in the future. Specifications are subject to change without notice.

Patents

Progressive International Products are manufactured or sold under one or more of the following U.S. Patents.

5, 790,410	5,663,887	5,361,216
5,831,861	5,663,887	5,270,943
5,694,326	5,663,887	5,108,742

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History of Document Revisions

Rev 1.0 – December 2018
Initial Release

REMOTE LINE MONITOR

RLM4 Manufacturer's Warranty

Progressive International Electronics, Inc. (SELLER) warrants to the Purchaser of fuel control equipment manufactured by Seller against defects in material or workmanship for one (1) year from date of shipment. Seller will replace or repair defective parts or replace and issue credits to the Purchaser's account in accordance with the following Conditions of Warranty.

CONDITIONS OF WARRANTY

1. Credit will be applied only when the completed warranty request form and the defective parts are received and inspected.
Decisions to repair or replace defective equipment are solely at the discretion of PIE.
2. When parts shipments are made prior to receiving the required warranty request and defective parts, they will be billed to the Purchaser.
3. In all cases, approved warranty requests will be expedited by issuing the appropriate credit to the Purchaser's account and shipping replacement parts.
4. Credits will not be issued for parts and no cash refunds for warranty credits will be made.
5. All components and parts must be returned to the factory prepaid, and in turn, replacement components and parts will be returned prepaid by the factory.
6. Seller's warranty applies only if the equipment has been installed and used in accordance with Seller's instructions. The warranty is void if any unauthorized alteration or addition has been made to the equipment or if it has been subject to damage caused by abuse, misapplication, accident or improper operation.
7. The Seller's liability for any damages, including contribution and indemnification, arising out of or in any way connected with the supplying of the equipment or its use, shall not in any case exceed the cost of repair of the equipment as herein provided. Upon expiration of the warranty, all such liability, as well as any other liability, shall terminate.
8. Nothing contained herein shall make the Purchaser, its agents or employees, an agent or representative of Seller and Seller assumes no responsibility of any act, omission, representation or warranty by the Purchaser or anyone else except as expressly stated herein.
9. The final Decision as to the validity of any claims arising under the warranty shall be determined solely by the Seller.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID OBLIGATIONS AND ARE HEREBY DISCLAIMED AND EXCLUDED BY SELLER.

WARNING

Installation must comply with the National Electrical Code, as well as Federal, State, Local and all applicable codes.

Do not install RLM in a volatile, combustible or explosive atmosphere. RLM must be protected from severe vibration, extreme temperatures, and excessive humidity.

Any peripheral equipment is to be installed in a non-hazardous location.

Any peripheral equipment connected to the RLM must be UL listed.

The RLM must be plugged into a dedicated 115 VAC wall socket.

SYSTEM INSTALLATION

System Warnings



Safety hazards are inherent with all electrical equipment. Standard precautions must be taken at all times during installation and operation of the RLM systems. In addition to normal electrical precautions, the following points should be noted during installation.

- Installation must comply with the National Electrical Code, as well as Federal, State/Provincial, Local, and all applicable codes.
- High voltages are present in the RLM components, as well as the equipment to which it is attached. To prevent personal injury or equipment damage, disconnect all power before proceeding with installation.
- RLM equipment must be installed in non hazardous areas. The main box must be protected from severe vibration, extreme temperatures and excessive humidity.
- All equipment connected to the RLM must be UL-approved and mounted in a non-hazardous location. Standard RS232 or RS485 connections must be used.
- The RLM is intended for use with other devices, such as tank monitors, which determine whether leaks exist at a site. The RLM device cannot determine if product leaks are present.

For Use in USA

Installation of the RLM fuel control system must comply with the requirements of the National Electrical Code (NFPA 70), the Automotive and Marine Station Code (NFPA 30A), and all Federal, State, Local, and applicable safety codes.

For Use in Canada

Installation of the RLM fuel control system must comply with the requirements of the Canadian Electrical Code, the Flammable and Combustible Liquid Code, and all Federal, Provincial, State, Local, and applicable safety codes.

The installation of the systems covered by this manual in conjunction with equipment not UL Listed has not been evaluated by the Underwriters Laboratories and is outside the intended use of this equipment. Warning: All dispensing equipment discussed in this manual is not UL Listed and the combination has not been evaluated by Underwriters Laboratories.

SYSTEM INSTALLATION

System Evaluation

IMPORTANT!

One of the most important steps in the installation of any RLM takes place prior to any equipment installation. To ensure that the correct equipment is being purchased for an application, a site survey should be completed, listing all the fuel dispensing related equipment.

The survey should include:

- Model numbers of both dispenser and DBox
- Manufacturer of equipment
- Number of dispensers
- A simple drawing describing the station layout

System Installation Checklist

The line monitoring system should be installed in the following order.

1. Install dispensers and controlling console according to manufacturer's specifications. Test dispensers with console for proper operation. *See System Installation Requirements below.*
2. Install Tank Monitor System according to manufacturer's specifications. *See System Installation Requirements below.*
3. Mount RLM. *Refer to the General Installation section of this manual.*
4. Connect system components to specific dispenser box (DBox). *See Pump Specific Installation section for the appropriate brand of dispenser.*
5. Test RLM with data through diagnostic port.
6. Connect to Tank Monitoring System and test fully integrated system.

SYSTEM INSTALLATION

System Installation Requirements

In preparation for RLM installation, ensure that the following requirements have been met.

1. Following the manufacturer's installation instructions, install the dispensing equipment (dispensers and data distribution boxes.)
2. Test all dispensers in stand-alone (manual) mode.
3. Test all dispensers with same brand console to check basic dispenser functionality and confirm a working communications link between the DBox and the dispensers. On dispensers which have programmable identification numbers, ensure that the numbers are set correctly. If multiple dispensers contain the same ID number, communication conflicts will occur.

All dispensers and communications should be functioning properly before proceeding with RLM installation. If not, refer questions to the dispenser vendor/manufacturer

Description of RLM Components

The RLM systems are made up of the components listed below. Using this checklist, identify and familiarize yourself with each of the components in your shipment. (For further clarification, refer to the block diagrams at the end of each section in the Pump Specific Installation portion of this manual.)

Component Checklist

- RLM Main Box with power transformer and connector for dispenser cable
- Pump Communication Cable to connect the RLM to the fuel dispenser DBox
- Installation Manual

RLM General Specifications

Physical Size	7.5" x 8.5" x 2"
Operating Temperature	59 to 104 degrees F
Storage Temperature	32 to 120 degrees F
Electrical Requirements	115VAC, 20 W Maximum (dedicated circuit)

GENERAL INSTALLATION

Read System Installation section, as well as this entire section of installation manual before attempting to install the RLM Mech. Note System Installation Warnings in System Installation section. Referring to all Diagrams in this section, proceed with RLM Mech installation.

1. A junction box with a single receptacle outlet must be provided. *See RLM Mech Power Requirements listed below.*

RLM Mech Power Requirements

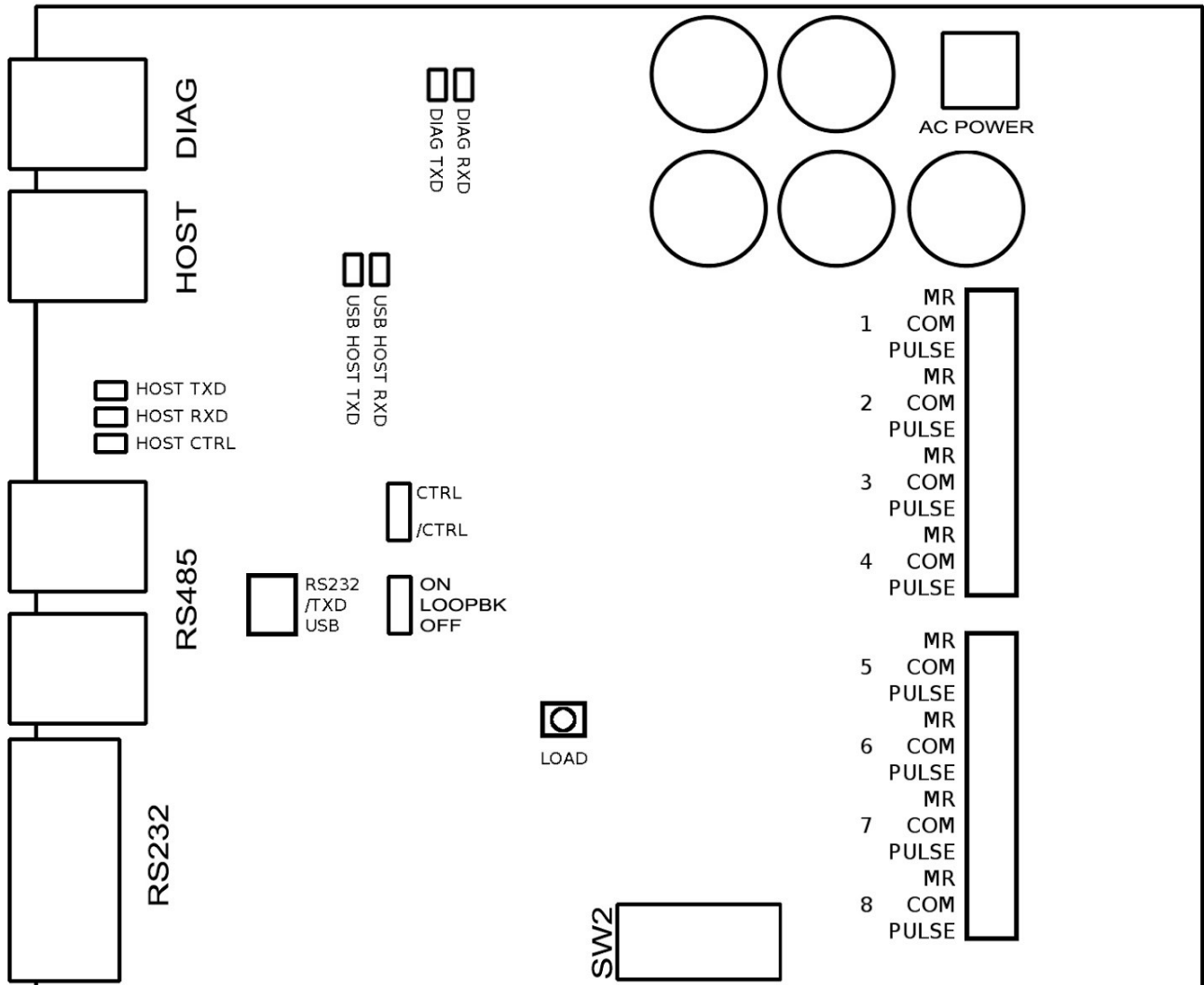
The RLM Mech must be powered from a dedicated 115 VAC single circuit breaker, with no other devices connected to wire or breaker. Do not use a switched neutral breaker. The neutral must come directly from the neutral bus in the electric supply panel. No other neutral circuits may be connected to this wire.

The electric supply system earth bond must connect to a driven ground rod or other earth bonding systems that comply with the National Electrical Code, Article 250.

Failure to comply with these requirements will void warranty.

2. Securely mount the RLM Mech main box in a non hazardous location according to the suggested layout in the tank monitor installation instructions.
3. Set all jumpers and dip switches on the RLM Mech main board according to the specific application requirements. These settings affect the tank monitor communications parameters such as baud rate, parity, data bits and device addressing. Also, these jumpers allow the RLM Mech to be configured for daisy-chaining together using RS485 multi-drop circuitry.
4. Mount pulsers on volume shaft of mechanical dispenser computer.
5. Identify unused switch in electric reset for use as a return switch on the RLM Mech.
6. Wire the pulsers and motor return (MR) switches to the RLM Mech.
7. Connect a PC to the installed RLM4 in one of the following ports: USB or RS232.
8. Plug the wall transformer into the dedicated power outlet to apply power to the RLM Mech system.

Diagram: Top View of RLM-Mechanical Board



Layout for SW2

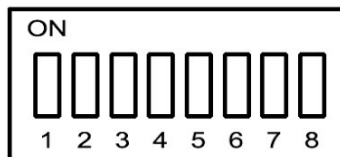
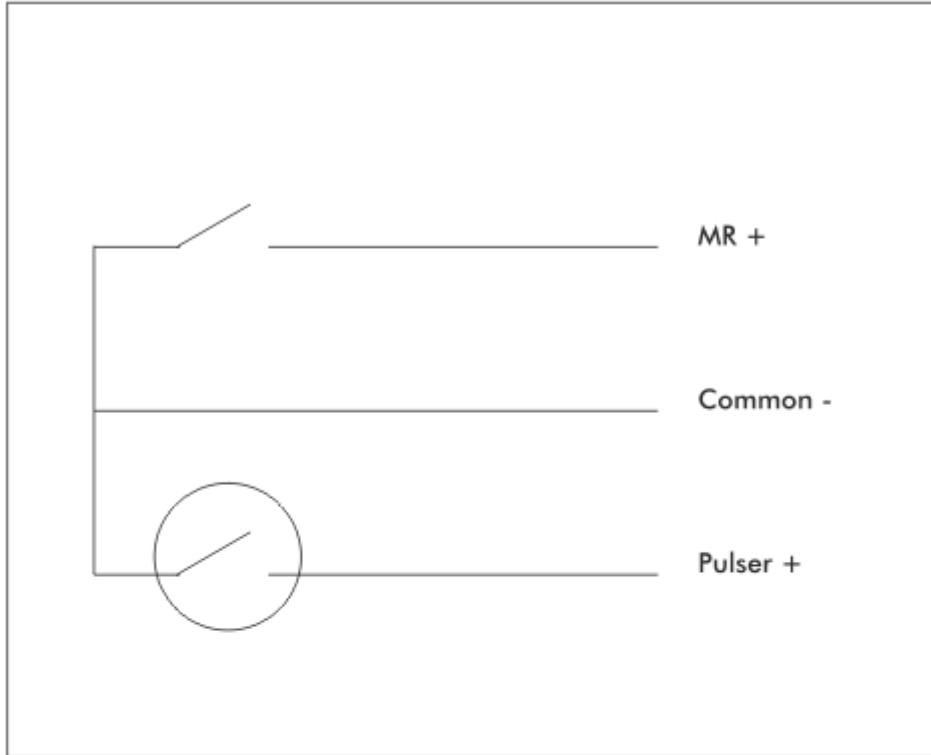


Diagram: Pulser/MR Circuit



The RLM Mechanical has 8 pulse monitor inputs. The pulses are accumulated when a pulse input is monitored, going from a low to a high state. The pulse is ignored if the MR input is not low. The pulses are recorded as they occur and can be read at any time.

The pulse and MR inputs are optically isolated from the main logic. To activate the input, the signal is shorted to common by the switches shown. These inputs are meant to be connected to a switch/relay type device such as a read switch or relay contacts. The pulser must provide 1 pulse per 1/10 gallon. A few examples of this type of pulser are:

- Veeder Root Pulser
- Veeder Root Pulser -- Totalizer (volume type)
- Wester Electric Pulser
- PMP Pulser

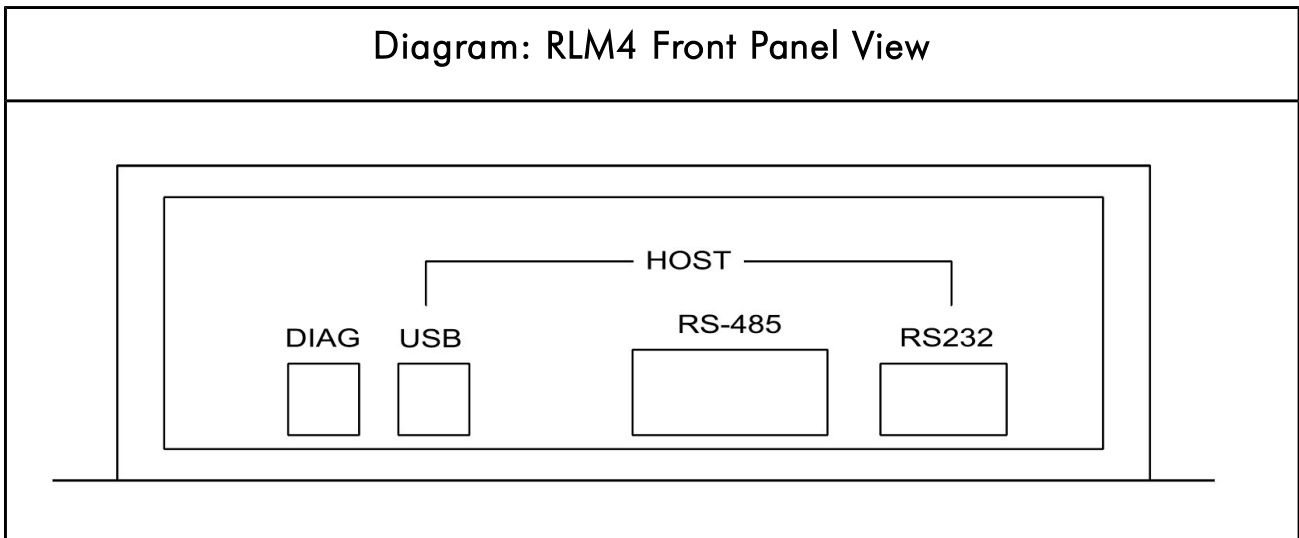
Contact the pulser manufacturer/dealer for pulser model recommendations for this application.

WARNING
Serious damage will occur to the RLM Mech if 110VAC is applied to the input pins.

Diagram: RLM4 Dip Switch Settings

SW2		1	2	3	4	5	6	7	8
Baud Rate	1200	ON	ON	---	---	---	---	---	---
	4800	OFF	ON	---	---	---	---	---	---
	2400	ON	OFF	---	---	---	---	---	---
	9600	OFF	OFF	---	---	---	---	---	---
Data Bits	7	---	---	ON	---	---	---	---	---
	8	---	---	OFF	---	---	---	---	---
Parity	None	---	---	---	ON	ON	---	---	---
	Even	---	---	---	OFF	ON	---	---	---
	Odd	---	---	---	ON	OFF	---	---	---
	None	---	---	---	OFF	OFF	---	---	---
Address	0	---	---	---	---	---	ON	ON	ON
	1	---	---	---	---	---	OFF	ON	ON
	2	---	---	---	---	---	ON	OFF	ON
	3	---	---	---	---	---	OFF	OFF	ON
	4	---	---	---	---	---	ON	ON	OFF
	5	---	---	---	---	---	OFF	ON	OFF
	6	---	---	---	---	---	ON	OFF	OFF
	7	---	---	---	---	---	OFF	OFF	OFF

Diagram: RLM4 Front Panel View



DIAGNOSTICS

Features and Operation of the RLM4 Diagnostic Port

Extensive testing and data collection is available through the RLM4's built-in diagnostic port, which is located on the front panel of the RLM4. See *Diagram: RLM4 Front Panel View*. Accessing the diagnostic port requires a computer running a terminal emulation program such as PuTTY or HyperTerm, and is made using a USB A to B cable. Once the connection is established, a prompt will appear. To view a help menu, type a ? at the prompt. If you have more questions regarding the Diagnostics, please call your distributor.

The terminal emulation program must be set to the following parameters.

Baud rate	57600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None
Terminal Emulation Setting	ANSI

Configuration

Once connected to the Diagnostics, you will need to verify the Pulse Configuration for each channel. Follow the steps below to configure each channel.

1. At the top level of Diagnostics, select **D** to enter Section Diagnostics.
2. Select **P** for the Pump Control Section.
3. Select **C** to Configure.
4. Select the appropriate number (1, 2, or 3) that corresponds with the desired configuration. See *Diagram: Pulse Configuration below*.
5. Settings are for an individual channel, so the configuration must be changed for all channels.

Diagram: Pulse Configuration	
Pulse Configuration	
Channel 1: 10 Pulse Per Gallon	
100 Pulse Per Gallon ...	[1]
10 Pulse Per Gallon	[2]
1 Pulse Per Gallon	[3]
Next Channel	[+]
Previous Channel	[-]
Select Pulse Configuration->	

FIELD UPGRADE

Download Application

Contact PIE for upgrade files that can be loaded via STM32 Update Loader. *This utility is available on our website: www.pie-corp.com.*

1. Power down the RLM.
2. Connect USB A to B cable to the DIAG port.
3. Press and hold the LOAD button on the PC board. *Refer to Diagram: Top View of RLM-Mechanical Board to locate this jumper.*
4. Power up the RLM and release the LOAD button after a few seconds.
5. Open STM32 Update Loader and use these settings:
 - Port Name: Com port # for Diagnostics
 - Baud Rate: 256000
 - Parity: Even
 - Echo: Disabled
 - Timeout(s): 10Select Next
6. The screen will read: "Target is readable. Please click "Next" to proceed." If it does not have this message (or a similar message), go back and verify that all of the settings on the previous page are correct. Also check that no other device is trying to use the Diagnostics Com Port (HyperTerm or PuTTY, for example.)
Select Next.
7. Change Target to STM32_XL-density_1024K.
Select Next.
8. Make sure that "Download to device" is selected. Select the file in "Download from file" Leave all other options on this page as they are.
Select Next
9. Close STM32 Update Loader when complete.
10. Power cycle the RLM.