

## PBM RailPro Power Backup Module

### INSTRUCTION MANUAL

Thank you for purchasing this RailPro Power Backup Module by Ring Engineering. We take pride in the products that we produce and hope you find this PBM module to be a great addition to your model train layout.

Please read all warnings and instructions before installation and use. For the latest information from Ring Engineering, please visit us on the web at [www.RingEngineering.com](http://www.RingEngineering.com).

**WARNING:** This product contains small parts and is not recommended for persons under fourteen (14) years of age.

**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**WARNING:** Maximum voltage is 16 Volts. Only power your PBM module with a Ring Engineering Inc. RailPro Power Supply designed for the PBM or a DCC power supply that only has the signal that is described in NMRA DCC standards S-9.1 and S-9.2.

**WARNING:** If this module is wired incorrectly, or the maximum allowed voltage is exceeded, it is possible that enough heat can be generated to ignite flammable material causing a fire.

**WARNING:** Do not remove enclosure.

**WARNING:** If the Capacitors connected to the PBM circuit board feel loose, discontinue use and return to Ring Engineering Inc. for repair.

**WARNING:** Temperature: Operating 32F to 80F, Storage 0F - 110F

**WARNING:** Operate and store in dry environment only. Relative Humidity: Operating 20% to 90% non-condensing, Storage 10% to 95% non-condensing

### Description

The PBM is a module that you can install into a model train locomotive. If the model train wheels loose connection from the track because of dirty track or other problems, the Power Backup Module will supply power to the Locomotive module for up to many seconds to keep operating properly without sounds, lights, or even motor stopping!

### Operation

The PBM-2 needs 2 to 3 minutes to charge before it will operate properly. You should power up the locomotive on a section of track that has known good power and wait the charge time before beginning to move the locomotive.

For the PBM to operate as expected, the typical voltage on the track should not be less than 12.6 volts nor more than 16 volts.

## Installation

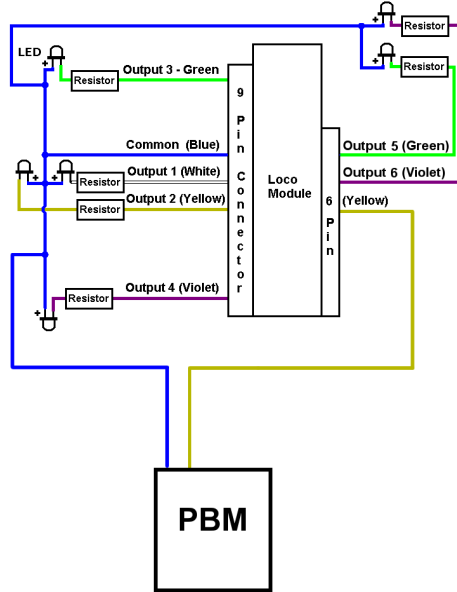
**IMPORTANT:** You must use adapter board (sold separately) for LM-2(S) or LM-1 modules. You do not need an adapter board for LM-3(S). LM-3(S) can be connected as shown below.

**IMPORTANT:** The PBM should only be used on HO Scale locomotives.

### STEP 1

Connect the blue and yellow wires per the wiring diagram below.

**IMPORTANT:** The yellow wire on the PBM should be connected to the yellow wire on the LM-3(S) 6 pin connector and not to the yellow wire on the 9 pin connector.



### STEP 2

Choose a location in the locomotive that the PBM will fit and securely mount the PBM in the locomotive. Do not mount the PBM near components that get hot.

**IMPORTANT:** Do not force the locomotive shell or the PBM if it is not fitting properly because you may damage the PBM.

**Tip!** If the PBM module does not have enough room in the locomotive you may be able to remove or modify a weight to create the required space.

When finished, be sure the wiring is not rubbing on the motor weights or axles!

## Limited One Year Warranty

Ring Engineering, Inc. (Ring Engineering) warrants that for a period of one year from the date of purchase, this product will be free from defects in material and workmanship. Ring Engineering, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with new or remanufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty.

This warranty is valid for the original retail purchaser from the date of initial retail purchase and is not transferable. Ring Engineering dealers, distributors, or retail stores selling Ring Engineering products do not have the right to alter, modify, or in any way change the terms and conditions of this warranty.

The warranty does not cover normal wear of parts or damage resulting from negligent misuse or modification of the product. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes, and tornadoes.

Ring Engineering shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty or condition. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. Ring Engineering disclaims all other warranties or conditions, express or implied statutory or otherwise. Some states or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

### How to Obtain Warranty Service

Send the product with a copy of the original sales receipt included by UPS or Parcel Post with insurance prepaid to:

Ring Engineering, Inc.  
228 W. Lincoln Hwy. #167  
Schererville, IN 46375

Make certain that your Ring Engineering product is properly packed to avoid damage in transit to the factory. Please allow four to six weeks for service. Please also make sure to include return and contact information (Your name, address, phone number and e-mail address if you have one).

If your Ring Engineering product is not covered by warranty, or has been damaged, an estimate of repair costs or replacement costs will be provided to you for approval prior to servicing or replacement.

PBM Circuit board design copyright 2020 Ring Engineering, Inc.

PBM Microcontroller Firmware copyright 2020 Ring Engineering, Inc.