



Model Railroad Auto Reverse Module (AR-1)

User Manual

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Introduction

Thank you for purchasing this Ring Engineering product. We take pride in the products that we produce and hope you find this product to be a great addition to your model railroad layout.

Please read all warnings and instructions before installation and use. For the latest information including the latest revision of this manual please visit our Internet site at www.RingEngineering.com.

The AR-1 is used to power special configurations of track such as in figure 1. These configurations of track would cause a short circuit if connected without the use of an AR-1. Note that in each configuration if you follow Rail 'A' around you will notice that it connects to Rail 'B'! That is just like putting a piece of metal across Rail 'A' and Rail 'B' which would cause a short circuit and in turn would cause a power supply to shut down. The solution to power special track configurations like below is to add insulation gaps and power the sections with an AR-1. The AR-1 can also be used to isolate small sections of track, limiting the impact of short circuits if derailments occur to just one area of your layout.

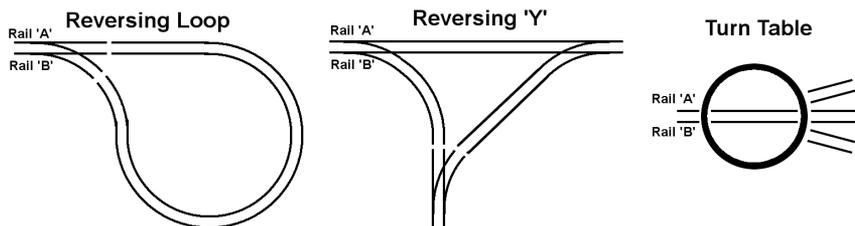


Figure 1.

Warnings

- ⚠ WARNING:** Only connect an AR-1 module to an approved Ring Engineering Power Supply.
- ⚠ WARNING:** Never connect a Ring Engineering AR-1 to a DCC power supply. Our AR-1 is only designed to work with Ring Engineering RailPro products.
- ⚠ WARNING:** Be sure to perform the 'Coin Test' as described in this manual.
- ⚠ WARNING:** This product 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.
- ⚠ WARNING:** There are no user serviceable parts inside. Return to Ring Engineering 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

Installation

Step 1 – Mount your AR-1

Position the AR-1 under your layout near the reversing section of track that you plan to wire to the AR-1. Use at least 2 screws and mount the AR-1. If only using two screws, be sure the screws are located in opposite corners. The red arrows in figure 1 below identify mounting hole locations.



Figure 1.

Step 2 – Connect the Wires

Be sure the power supply you are going to connect to the AR-1 is turned off. Then connect the power supply to the “To Power Supply” terminals labeled ‘PS1’ and ‘PS2’ with 16-gauge wire. Then connect the ‘RT1’ and ‘RT2’ terminals to the reversing section of track.

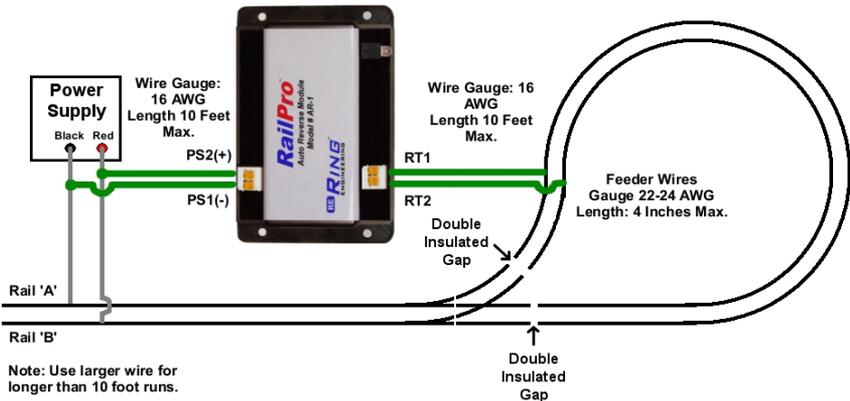


Figure 2.



Only connect a Ring Engineering approved power supply to the proper power input connections such as the PWR-56. Maximum voltage is 16 Volts DC. Never connect a DCC power supply to the AR-1.



If the power supply you are using is capable of auto-reversing, be sure the power supply is set to ‘Auto Reverse DISABLED’.



NOTE: The AR-1 IS polarity sensitive. You must connect the power supply positive (red) to the positive input on the AR-1 (PS2) and the power supply negative (black) to the negative input on the AR-1 (PS1).

The AR-1 is equipped with spring-loaded terminals for fast and secure connections that do not require a tool. To connect a wire to the terminals, first strip 3/8 of an inch (about 2/3 the length of the terminal block) of insulation off of the wire. Then press the orange push button over the contact that you want to connect a wire to. Insert the wire into the round hole under the orange push button. Be sure the wire goes all the way to the back of the terminal block while holding down on the orange push button. When you feel the wire touch the back of the terminal block, release the orange button to secure the wire into the terminal block. Give the wire a tug to be sure it is securely connected.

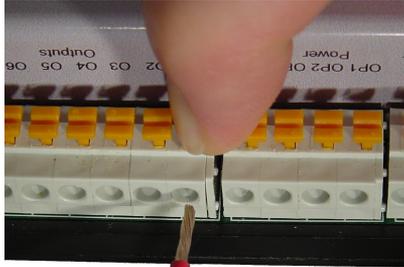


Figure 3.

Step 3 – Do the Coin Test before using your AR-1

This step is important. This step is important because your AR-1 needs to be able to shut off when the track is shorted. This test will confirm if your track is wired well enough so the AR-1 will be able to detect the short and turn off. If the track is shorted and the connection of the AR-1 to the track is poor, the short will not draw enough power from the AR-1 to detect the short, and the AR-1 will not turn off, delivering power to the track's bad connection. Although it is very unlikely, it is conceivable that a bad connection could heat up enough to ignite flammable material near the bad connection. This precaution would be the same for any model railroad power supply with the same amount of power whether it was RailPro, DCC, or Analog.

Use a quarter and place it across the rails of your track as shown in figure 4 and be sure the AR-1 power indicator light turns red.



Figure 4 – Coin Test

A red light indicates that the short was detected and the power to the track was turned off. If the light does not turn red when the quarter is positioned on the

track, then the wiring to that section of track needs to be improved. You may need to improve the connections to that section of track, or use thicker gauge wire to feed that section of track. Go along the track and do the quarter test to every section (at least every 3 feet) of track until each section is tested and passes this test.

Since the track is exposed and can easily be shorted by things like a derailed locomotive, your AR-1 has built in short circuit protection with auto recovery. When a metal object gets across the track rails, the AR-1 outputs are connected together and you create a short circuit. The AR-1 will automatically detect the short circuit, turn off the output, and the power indicator light will turn red. If the output is off, all trains in the reversing section will stop because they will no longer have power. The power indicator light will stay red until the short is removed. After a few seconds from the short being removed, the AR-1 will automatically turn the power to the track back on.

Your AR-1 is now ready to use!

Operation

There is only one thing to be aware of while operating your AR-1. You should be sure that both isolation gaps are not crossed by two locomotives at the same time. In a locomotive, usually the wheels are wired together inside so when a locomotive is across the gap, one set of wheels are contacting the track on one side of the gap and the other set of wheels are contacting the track on the other side of the gap. This means that when a locomotive drives over a gap the rails on both sides of the gap are connected together by the locomotive. And this is ok if one gap at a time has a locomotive over it. But if two locomotives are across both gaps at the same time, then that will create a short circuit from Rail 'A' to Rail 'B' and the power supply connected to the AR-1 will shut down. Also keep in mind that most products that use electricity from the track such as lighted passenger cars, our End of Train Devices, etc., have the wheels wired together and can cause the same problem as a locomotive if across both gaps at the same time. In other words if a locomotive is across one gap, and at the same time a lighted passenger car is across the other gap, the power supply will shut down causing the train to stop running.

Indicator Light Status

Indicator Color	Status
Flashing Green	Powering Up
Green	Output ON in the Forward Direction (Normal Operation)
Orange	Output ON in the Reverse Direction (Normal Operation)
Solid Red	Output shorted (Automatically recovers when short removed)
Red Flashing 4 times	Power Supply Input is Under Voltage (Cycle Power to Reset)
Red Flashing 6 times	Over Temperature (likely cause: ambient temperature is too hot) (Cycle Power to Reset)
Red Flashing 8 times	Power Supply Input is Over Voltage (Cycle Power to Reset)

Warranty

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 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.

To obtain warranty service contact Ring Engineering at:

Email: info@ringengineering.com

or Phone (219) 322-0279

to get a return authorization and return instructions.

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.