



# **PWR-75 Model Railroad Power Supply**

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## **User Manual**

**Ring Engineering Inc.**  
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**Revision 1.03**

## 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](http://www.RingEngineering.com).

The PWR-75 is a Power Supply that can be used to supply power for your locomotives, turnouts and other accessories. The PWR-75 has 75 Watts of output power! That is enough power to drive 20 or more typical modern locomotives! Also, the advanced technology of the PWR-75 maintains a stable output voltage within about 3% from no load to full load! Typical model railroad power supplies can have voltage drops as high as 30% at full load. Unlike typical model railroad power supplies, when you need full power, your Ring Engineering PWR-75 will deliver! Further, each PWR-75 is equipped with Direct Radio! Because it has Direct Radio you can control, setup, and monitor your PWR-75 with any RailPro controller, such as the HC-1 with color touch screen, without connecting any wires. With a RailPro controlling device, you can turn the output to the track on or off, monitor the output power your PWR-75 is delivering, adjust settings such as the auto-reverse feature, and more!

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## Warnings

- This product is not recommended for persons under the age of fourteen (14).
- No user serviceable parts inside. Return to Ring Engineering for repair.
- Only connect the PWR-75 to a wall outlet that is 120VAC 60Hz and has a three terminal grounded receptacle.
- Do not connect any products to the PWR-75 output unless it has a Ring Engineering controller module installed. For example: a locomotive should not be placed on a track that the PWR-75 is connected to, unless it has a Ring Engineering LM-1 module installed into it.
- Never connect this Power Supply to a track that is connected to another manufactures power supply. Damage could happen to either power supply and in the worst case may result in a fire.
- Always follow the directions that Ring Engineering provides if you are going to connect multiple Ring Engineering power supplies to the same model railroad layout.
- Be sure that your layout passes the short circuit test described in this manual before you operate your model railroad layout.
- Be sure you do not block the air vents on the bottom of the PWR-75 and be sure the output of the fan on the back is clear.
- Sticking objects into the openings of the PWR-75 may cause death by electrocution.
- This product contains a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). This product contains lead.
- If you see dust build up in the fan area or the vent holes on the bottom, unplug the PWR-75 and use low-pressure compressed air to blow out any dust. If the dust cannot be easily removed, send the PWR-75 back to Ring Engineering for a cleaning. Be sure the fan operates after cleaning.
- If the fan stops operating, discontinue use of the PWR-75 and return to Ring Engineering for repair.

## RailPro

Your PWR-75 is a RailPro product by Ring Engineering!

**RailPro**<sup>TM</sup>



RailPro products by Ring Engineering are professional and very easy to use model railroad control products, which can be enjoyed by beginners and experts alike. RailPro products are equipped with Direct Radio and are designed to work together to make a control system for model railroads. Direct Radio allows the RailPro components to communicate with each other without any wires! Direct Radio is very fast giving your RailPro products quick response to your controls. A typical RailPro system would consist of a Controlling device, like the HC-1, a power supply, locomotive and other accessory modules. The HC-1's color touch screen displays the products for you to control. By simply touching the screen on a controlling device you can control, setup and monitor your locomotives, accessories modules and this PWR-75. You can add additional controlling devices, locomotives, and accessories to take full control of your model railroad layout! RailPro makes adding new products like this PWR-75 easy. All you have to do is press the "Find Product" button on the touch screen. RailPro will search for the new products and load the new products image onto the controller. Next, all you need to do is touch the picture of the product you want to control and you are in control! The color graphic screens make it so simple to use that many users will not need to read the manual to even setup advance features because all the controls are displayed with pictures and meaningful text.

## Features

- Simple setup via a Color Touch Screen Controller. The setup using a RailPro controller is so easy many users may find it not necessary to use a manual to even adjust more advanced settings like Auto-Reverse Enabled or Disabled.
- You can give the PWR-75 a Password so only the people you want can control the PWR-75.
- You can give the PWR-75 a name so it can be easily recognized on the screen.
- Short Circuit detection with auto recovery.
- Can be used as a Direct Radio Repeater.
- Monitor the output power with a RailPro controller.
- Monitor the temperature with a RailPro controller.
- The PWR-75 has regulated output. When your locomotives need more power, the PWR-75 delivers!
- You can configure the PWR-75 for Auto-Reversing.
- You can use multiple PWR-75's to increase the number of locomotives and other accessories.
- The PWR-75 program can be updated to a newer revision by receiving information through Direct Radio! It is possible that you will be able to get a newer version of the Program for your PWR-75 from Ring Engineering's Internet site and add new capabilities that currently do not exist in your PWR-75! There are two ways to update the Program in this PWR-75. 1) Use a controlling device like the HC-1 and load a new program from Ring Engineering's Internet site [www.RingEngineering.com](http://www.RingEngineering.com). 2) Send the PWR-75 back to Ring Engineering and our technician can do it for you. There will be a fee involved to send the PWR-75 to Ring Engineering for an update.

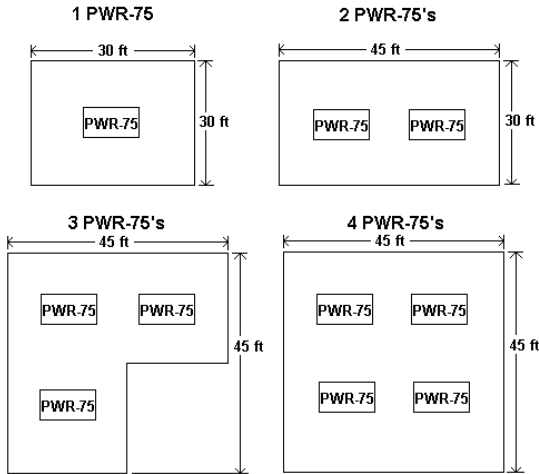
## Installation

### Step 1

#### Choose a good location for your PWR-75.

The best location for the PWR-75 is near the middle of the track. There are two reasons for locating the PWR-75 near the middle. The shorter the wires are to the track, the less power will be lost in the wiring. The second reason is your PWR-75 makes a great Direct Radio repeater. Your controlling devices can send commands directly to your products, such as locomotives, or your controlling device can send a command to your PWR-75 first and your PWR-75 can send the command on to your locomotive. By using repeaters, your RailPro system can have multiple paths for communication providing dependable communications to your locomotives, accessories, etc. Please see your controlling devices manual for more information about Direct Radio repeaters. If you have more than one PWR-75, it is best to equally space the PWR-75's and centrally locate them like in Figure 1. It is recommended to space multiple PWR-75's 15 ft apart or less for the purpose of Direct Radio repeaters. It is very possible that much greater spacing will work well. With 4 repeaters, the effective control area is over 2000 sq ft (45 ft x 45ft). The PWR-75 must be placed on a hard smooth surface so cooling air can

enter from the holes in the bottom of the PWR-75. Also, there should be at least two inches of space behind the fan for air to exit.



Recommended placement for 1-4 PWR-75's. Note: the distance between PWR-75's and the edge of your model railroad layout should be 15 ft or less.

Figure 1

## Step 2 Connect the two Output terminals to your track.

For a simple and small track, all you need to do is connect two wires from the red and black terminals on the PWR-75 to the track. Each of the two output terminals needs to be connected to one rail of the track. If you only have one power supply, it does not matter if the Red or the Black terminal is connected to a particular track rail. If more than one RailPro power supply will be used together, read the section "Multiple Power Supplies." If you are going to use your PWR-75 for Auto-Reversing, please read the Auto reversing section for more information on wiring your PWR-75 to the track.

For larger layouts, you will need to run bus wires under the track in order to have good power distribution throughout your entire layout. Basically, you should have two heavy gauge wires (Bus wires) under the track and periodically have much smaller wires (Feeder wires) that connect the bus wires to the track rails. The bus wires should be 12 – 14AWG. The feeder wires can be 22-24AWG. Feeders should be connected about every 6 - 10 feet. The power wiring for a good analog or DCC system should be good for a RailPro system. If your layout passes the coin test described below, then your wiring should be adequate.

**TIP:** You may get away with fewer feeders than one every 6 - 10 feet particularly if your individual sections of track are soldered together. Your wiring is good enough if you can pass the coin test described below.

### Step 3

**Plug the power cord of the PWR-75 into a standard wall socket with 120VAC and turn on the Power Switch.**

Your PWR-75 light should be yellow indicating that the output is on. If the light is red, or not lit up, please see the trouble shooting section.

### Step 4

**Do the Coin Test before using your PWR-75.**

***This step is important.*** This step is important because your PWR-75 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 PWR-75 will be able to detect the short and turn off. If the track is shorted and the connection of the PWR-75 to the track is poor, the short will not draw enough power from the PWR-75 to detect the short, and the PWR-75 will not turn off, delivering power to the tracks 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 2 and be sure the PWR-75 power indicator light turns red. 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.



Figure 2 – Coin Test

Since the track is exposed and can easily be shorted by things like a derailed locomotive, your PWR-75 has built in short circuit protection with auto recovery. When a metal object gets across the track rails, the PWR-75 red terminal is connected to the PWR-75 black terminal and you create a short circuit. The PWR-75 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 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 PWR-75 will automatically turn the power to the track back on, and the power indicator light will turn yellow.

## **Step 5**

### **Detect your PWR-75 with each Controlling Device.**

Before you will be able to control or monitor your PWR-75 you will need to detect it by a controlling device such as the RailPro HC-1 handheld controller with color touch screen. On your controller, you will need to press the “Find Product” button. Your controller will display “Loading Product”. After that, you will be able to select this PWR-75 from your Accessories page. After you have detected the PWR-75, you will be able to turn the track output on or off. You can also monitor the total power that your PWR-75 is delivering. If the power you are using is near 100% then you should buy another RailPro power supply to add to your system. You can even see if the temperature of the PWR-75 is OK. If the temperature of your PWR-75 is near the hot range, be sure there are no objects blocking the air holes on the bottom of the PWR-75 and that there are no objects within 2 inches of the fan on the back.

It is important that each controlling device that you will use in your system detects each RailPro power supply in your system. Each controlling device has a Stop All - Power Off option. The controlling device will only send a “turn off the power” command to the PWR-75 that it has detected and loaded. Please see your controlling devices manual, such as the HC-1’s manual for more information.

## **Step 6**

### **Give the PWR-75 a name and a Password.**

This step is optional.

The reason to give your PWR-75 a name is so you can tell it apart from another PWR-75. If you had two or more PWR-75s and did not name them, it would be difficult to tell which one you are going to control when you touch the picture of a PWR-75 on your controlling device. For example, if you have two PWR-75’s, one located more towards the north on your layout and one located more towards the south, you may name one “North” and the other one “South.” Then when you select the PWR-75 named “North” you could be confident which one you would be adjusting and controlling. You can give the PWR-75 any name that you would like.

It is recommended that you give your PWR-75 a password. Please read the Password section for more information.

## **Step 7**

### **Your PWR-75 is Ready to Use.**



## Password

You can set a password in your PWR-75. Further, it is recommended that you set a password in your PWR-75 right after you receive it. When shipped from the factory, your PWR-75's password is blank. When the password is blank, any RailPro controlling device can detect and control your PWR-75. Since RailPro uses direct Radio, it is possible to detect and control your PWR-75 from over 100 ft away. In other words, it is possible for your neighbor to control your PWR-75. However, if you put a password into your PWR-75, then your neighbor will not be able to detect and therefore not be able to control your PWR-75.

If you are going to use your PWR-75 in a train club, then you may want to give each RailPro power supply the same password. Therefore, when a club member gets a new controller, they can detect each power supply so their controller can send a "Stop All - Power Off" command and cause this power supply to turn off its output. See your controlling devices manual for more information on this feature.

## Multiple Power Supplies

A single PWR-75 is likely to operate 25 or more modern HO scale locomotives at the same time. However, if you want to run even more locomotives, turnouts, lights, etc, you can by adding multiple PWR-75's to increase the available power to your model railroad layout. You can add a second, third or even more power supplies by wiring them to your track as shown in figure 3. You will need to be sure the red terminals are connected to the same rail and black terminals are connected to the other rail. You will also need to be sure the red terminals of the power supplies are isolated from each other by placing gaps in the rail that the red terminals are connected to.

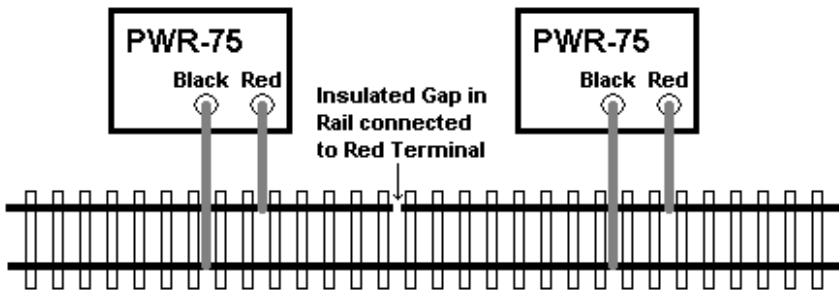


Figure 3 – Connecting Multiple Power Supplies

**TIP:** It is recommended that the PWR 75's wiring be connected to the track farther from the insulated gap instead of near the insulated gap. The farther from the insulated gap that the PWR-75's are connected to the track, the better the PWR-75's will share load when an insulated gap is crossed by a locomotive.

## Auto Reversing

Your PWR-75 has an auto-reversing feature built in to it. There are certain types of track configurations where Rail 1 loops back and is connected to Rail 2. This would be a short if insulation gaps were not installed. Further it is necessary for these types of configurations to be driven with a power supply that has auto reversing, the ability to change the red terminal from positive voltage to negative voltage, so when the train rolls across the gap the polarity of the output can be switched, so the resulting electrical short does not last but a very small amount of time. If you have a track configuration like in figure 4, you will need to set up a power supply as shown and enable the Auto-Reverses option. To enable the Auto-Reverse option, use a RailPro controlling device and go to the setup page for the PWR-75 then enable the Auto-Reverse option. Be sure to save your new setting. See your controlling device instructions for more information on this feature.

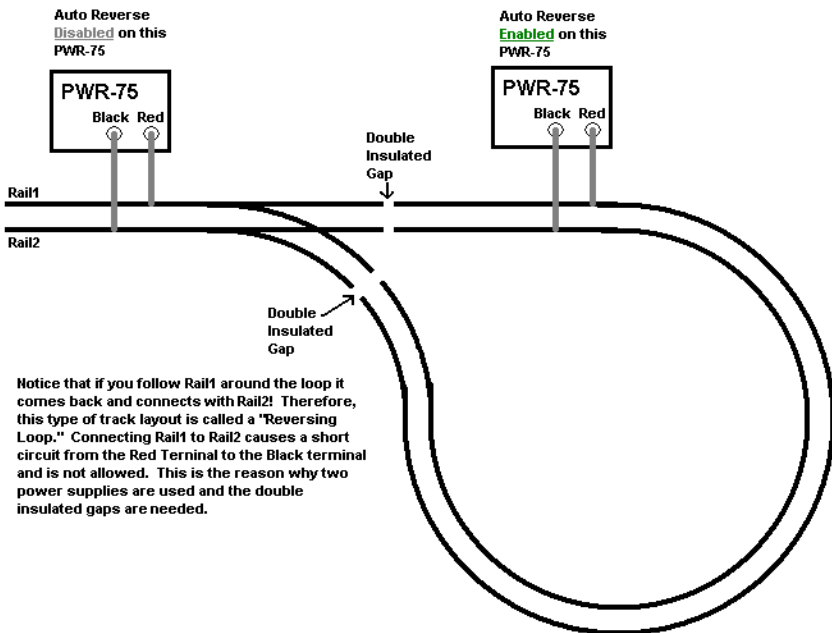


Figure 4 – Auto Reversing Loop Wiring Diagram

## Troubleshooting

Problem	Solution
<b>The power indicator light does not come on when the power switch is turned on.</b>	Be sure the power cord is plugged into the wall.
	Be sure the wall outlet has power.
<b>The power indicator light is green and there is no power to the track.</b>	The PWR-75 is on but not outputting power. Use a controlling device and turn on the output.
<b>The power indicator light is red.</b>	The output is shorted. Remove the short. If you remove the wire from the red or black terminal and the light turns yellow then your short is in the wiring to the track.
	Check the information page on a controlling device for this power supply. If the information page displays "Over Temperature" then be sure the vent holes in the bottom are clear and the PWR-75 is on a smooth flat surface. Further be sure the PWR-75 has at least two inches of space behind it so the fan is free to blow air out.
<b>There is no power to the track the light is yellow.</b>	If the light is yellow, connect a wire directly across the Red and Black terminals. If the light turns red (there must be power on the terminals) the problem is the wiring from the terminals to your track.

## 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 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](mailto: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.

## FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.