Used to protect conventionally powered layout sections on a digitally powered layout.

Measurements approximately: 3 9/16x2 9/16x1 inch (90x65x25mm)

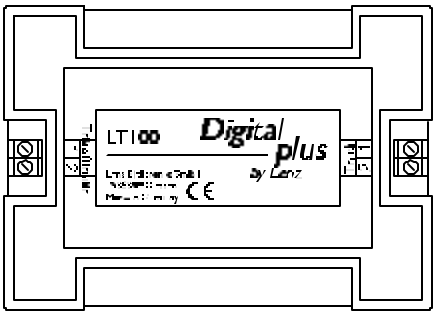
General specifications:

- Maximum voltage permitted: 18V effective
- Maximum current permitted: 3.5 A
- When using pulse width modulated power packs, the maximum frequency must not be higher than 150 Hz.

LT100
Digital Circuit Breaker

Art. Nr. 13 100
First edition, 01 01

Digital plus by Lenz™



How does the Digital Circuit Breaker work?

Let us assume that you control a part of your model railroad digitally and another part conventionally. For instance you may have a digitally controlled locomotive servicing facility and a conventionally controlled line divided into blocks.

If you now drive a locomotive (train) from one part into the other part, then the wheels of the vehicles will create a connection between the 2 layout parts. This connection will lead to a short circuit. Usually the digital system will shut off immediately. However it is possible for the digital and analog systems to combine in such a way that can either damage the analog system or the decoder. It is the task of the LT100 digital circuit breaker module to prevent this.

The digital circuit breaker is simply inserted between the conventional transformer (power pack) and the track. If a connection is created by the wheels of a vehicle, then the LT100 module will interrupt the connection between the conventional analog system and the track. This way a short circuit is prevented and no damage can occur.

The track is supplied with digital voltage during this time, so that the train can continue operating. Once the train has completely crossed the gap and the systems can no longer be combined the digital circuit breaker will reconnect the analog system. This happens very fast preventing any perceived interruption in power to the track. The result is a smooth transition between different control systems.

Both parts of the layout **must** be double gapped from each other at the “crossover points”.

Connecting the digital circuit breaker module

The basic connection of the digital circuit breaker module is shown in illustration 1.

The digital circuit breaker module is simply inserted in the supply line from your conventional power pack to the track. In other words, you cut the connection between power pack and track.

Connect the wires from the track with the terminals labelled “Gleis” (Track) on the digital circuit breaker module. Then connect the wires coming from the power pack with the terminals “Trafo” (transformer).

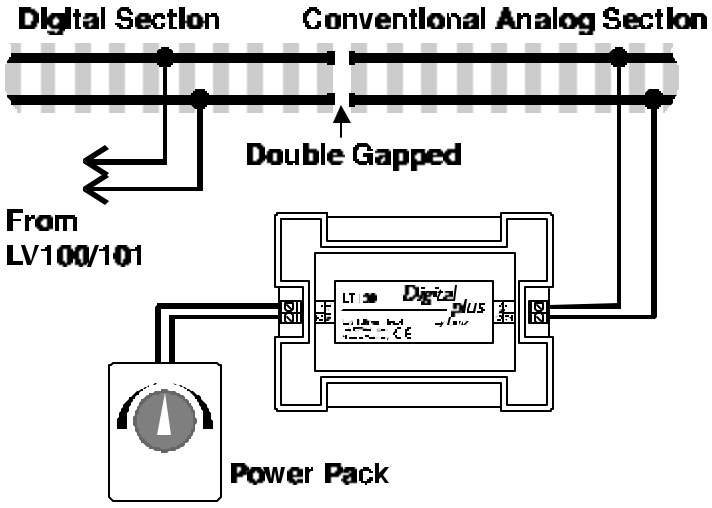


Illustration 1

Using Pulsed Power Analog Systems

Many pulsed power analog systems can both confuse decoders and the LT100. Locomotive with decoders may experience erratic operation on some pulsed power DC operation. This is evident if you find that the locomotive has problems operating slowly in one direction. The cure for this is to put a pair of anti parallel capacitors on the output of the DC power pack as shown in Figure 1. (Radio Shack, part number 272-1022) These capacitors will smooth out the pulses from the pulsed analog control system and allow the LT100 to work properly.

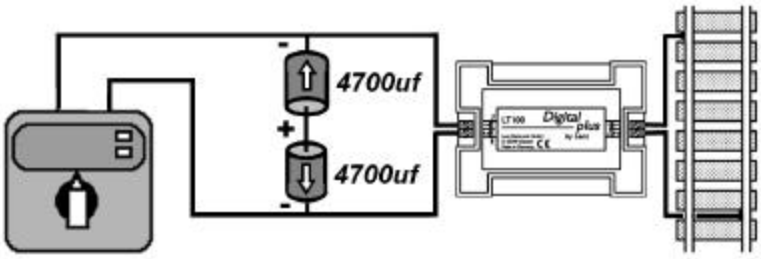


Figure 1 Anti parallel capacitors

Operation of the locomotive decoder at change over

All Lenz Digital Plus locomotive decoders can be used on conventional layouts with regular DC power packs. In conventional operation a locomotive with a Digital Plus locomotive decoder initially responds like a locomotive without a Digital Plus locomotive decoder. If the decoder has a built-in acceleration momentum, it will however be active.

Going from digital to conventional

Going from a digital layout area into a conventional area, the locomotive decoder will evaluate the polarity of the conventional section. If the polarity of the section (and the direction of travel based on this) agree with the direction of travel in the digital section, then the locomotive will continue on without stopping. The speed will however depend on the voltage level in the conventional section.

However, if the polarity does not match with the direction of travel, then the locomotive will stop, using the braking momentum programmed in the decoder.

Going from conventional to digital

If a locomotive goes from the conventional layout part back into the digital part, then the built-in locomotive decoder is again able to receive the digital information. Just as described above, there are 2 responses possible for the locomotive: If the direction of travel sent from the Digital Plus command station LZ100 is the same as the current direction of travel of the locomotive, then the locomotive also receives the transmitted speed data. The locomotive thus continues to travel.

If the actual direction of travel is not the same as the one transmitted by the command station, then the locomotive will stop using the programmed braking momentum.

The responses listed here can be put to use in the operation of a layout:

Tips for use

Following you will find two examples for useful applications for LT100

Interchange track

If several conventional locomotives are to be operating in the same power circuit in your conventional layout part, then it is recommended to use an “interchange track”. This track must be long enough for the longest train operating across it to completely fit onto it.

Using this track prevents digital voltage from entering the conventional area during the time that the conventional area is connected to the digital area by the vehicle wheels.

The wiring for such an interchange track is shown in illustration 2.

Braking at signals

The fact that the locomotive decoder will either brake or not when changing from digital to conventional,

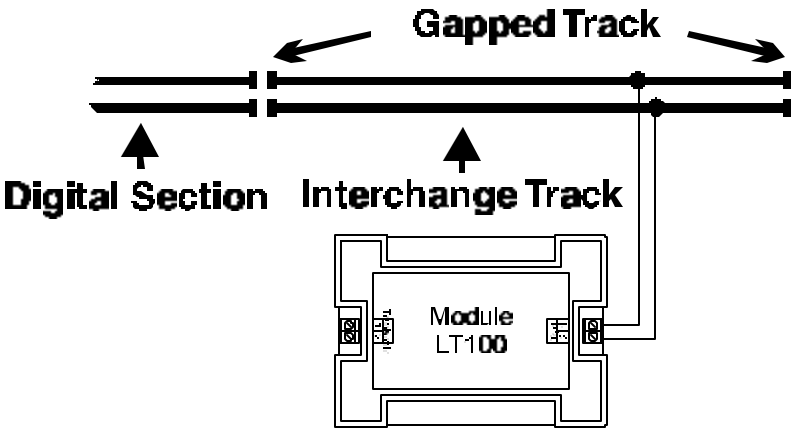


Illustration 2

depending on the polarity, as described earlier, can be used to accomplish automatic braking in front of a signal.

Install a double gapped (both rails) “braking section” in front of the signal. In illustration 3 this area is shown in gray highlighting. The length of this section is determined by the braking momentum programmed in the locomotive decoder. The section must be long enough for the locomotive to come to a complete stop inside the section.

Make the power supply for such a section switchable with a double pole switch (or relay), to alter between supply from the digital and the conventional power pack (as drawn).

Set the conventional power pack for a maximum voltage. Set the polarity such that in the direction of travel shown, the left rail is “plus”.

The double pole switch should supply the braking area with conventional DC power when the signal shows “red”, and when it shows “green” supply it digitally. This can be accomplished by using the contacts on a commonly available twin-coil model railroad relay, that is controlled together with the signal.

If the locomotive now enters this section, and the signal shows “red”, then the polarity and the direction of travel determined by it, do not agree with the digital direction of travel . The locomotive will thus stop using the programmed braking momentum. If the signal is set to “green” again, then the switch will again supply the braking section from the digital part of the layout. Through this the locomotive receives its speed commands again, and starts up with the programmed acceleration momentum. This page is intentionally left blank.

Not suited for children under 3 years of age because of small parts that may be swallowed. If used carelessly, injury may result due to functionally required sharp edges and points! Only for dry rooms. Reservation for error, as well as for changes due to technical improvements, product development or other production methods. Any responsibility for damage or incidental damages due to non-intended use, non-compliance with this manual, operation with transformers not certified for model railroads, altered or damaged transformers, or other electrical devices, unauthorized changes, acts of violence, overheating, moisture damage, etc. is excluded; this also voids the warranty.

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This equipment complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Please save this manual for future reference!