

Developed to simplify the wiring of reversing loops on two-rail layouts using NMRA Digital Command Control by allowing you to operate your trains through a reversing section/loop without manually changing locomotive direction or track polarity.

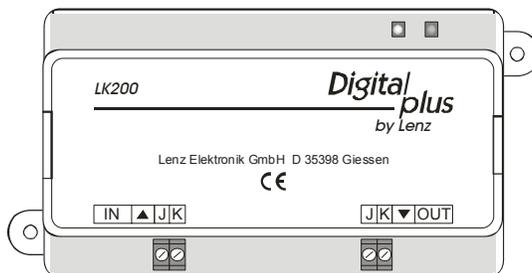
- Suitable for all scales from Z to G
- Functions when the first wheel on either rail crosses the gap
- Designed for safe use on both common rail and two rail wired layouts
- For DCC layouts only

LK200 Electronic Reverse Loop Module

Art. No. 12200
Revised 11/09

Digital

plus
by Lenz®



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The problem with reversing loops:

Every user of 2-rail DC knows the 'reversing loop' blues:

Including a reversing loop in a 2-rail DC layout leads to a short where the reversing loop ties into the main line.

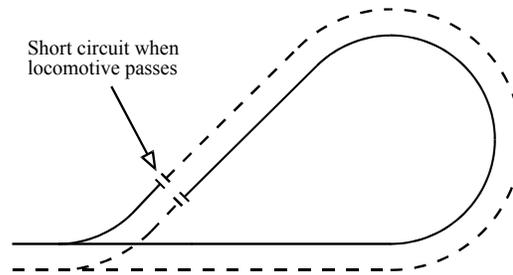


Figure 1: Basic Reversing Loop

The only way to prevent this short circuit is to insulate both sides of the track. A single two-rail gap is not enough, since a passing engine will short the rail through the electrical pick-up on both sides of the gap. Therefore, the track has to be gapped on both sides of the reversing loop. Once gapped, you still must ensure that the rails are not short circuited upon entry or exit of the reverse loop.

Usually, the polarity is selected such that there is no short circuit upon entry into the loop. While the train is in the loop, the polarity is changed, so that there is no short circuit at the exit of the loop.

On conventional layouts, this leads to a problem: Changing the polarity in the reversing loop will change the direction of the train, since the train's direction is dependent on the track polarity. Therefore, the direction also has to be changed at the power pack, so that the train keeps moving in the same direction on exit from the loop.

On **NMRA DCC** operated layouts, the direction of the train is independent from the polarity on the track, therefore, the polarity of the reversing loop can be changed without stopping the train or changing it's direction.

Function of the LK200:

The LK200 adjusts the polarity in the reversing section quickly and automatically for the passing train.

This happens in a simple way:

If the polarity is not correct when the train enters the reversing loop, the LK200 detects the short generated by the wheels of the locomotive and changes the polarity instantly. (see Figure 2) This happens so fast, that it is undetectable during the movement of the train. The short is removed, and the train can enter the reversing loop. This short can be detected even if only a single wheel of the locomotive bridges the gap.

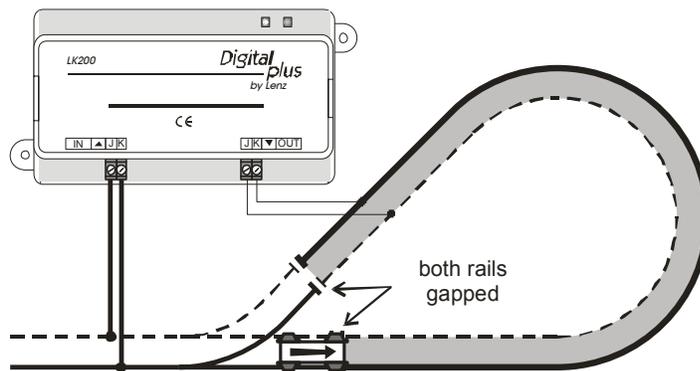


Figure 2

When the train exits the reversing loop at the other end, the ensuing short is detected by the LK200 and the polarity is adjusted accordingly. (see Figure 3)

Note:
The LK200 requires no user adjustments and is suitable for all scales from Z to G.

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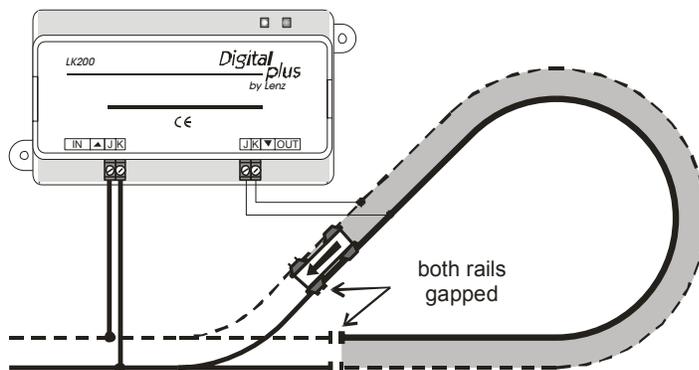


Figure 3

Note:
The LK200 does not function for two-rail DC layouts powered by conventional 12 volt DC!

Connecting the LK200 to the Layout

The LK200 is easy to connect to your layout as shown in Figure 4.

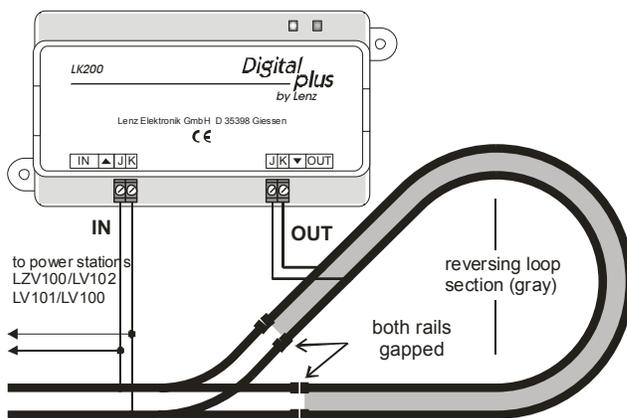


Figure 4

Connect terminals "J" and "K" of the terminal pair "IN" to terminals "J" and "K" of the track or Power Station (Booster), to the track near the reverse-loop area, or to the track bus which supplies this track section.

The reverse-loop area (highlighted in grey) that is isolated on both rails on both the entry and the exit sides is connected to terminals "J" and "K" of the terminal pair "OUT".

Regardless of the track layout, the reverse-loop area (which is the area supplied by the output of the LK200) must always be long enough to be able to accommodate in its entirety the longest train operating on the layout!

Advice:

The track section before and after the reverse-loop area must be supplied by the same Power Station as the reverse-loop area!

LK200 LED Operating display

The two LEDs on the LK200 indicate the operating status of the reverse loop.

If the yellow LED is on, the output terminals "J" and "K" have the same polarity as the input terminals "J" and "K".

yellow LED is on		
IN	connected to	OUT
J	→	J
K	→	K

If the green LED is on, the output terminals "J" and "K" have the reverse polarity as the input terminals "J" and "K".

green LED is on		
IN	connected to	OUT
J	↔	K
K	↔	J

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If neither of the two LEDs is on, no track voltage is being detected at the LK200's J, K input.

Monitoring the reverse-loop area using occupancy detectors LB100/LB101

If you want to monitor the reverse-loop area with an occupancy detector, connect the LB100/LB101 input to the output of the LK200.

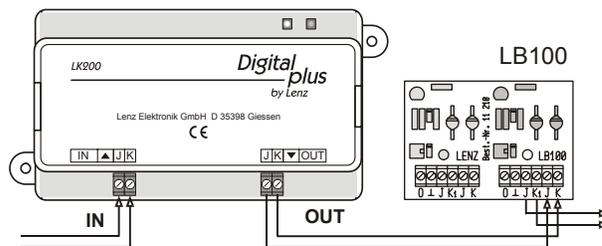


Figure 2: Connecting the LB100 to the LK200

Figure 5 shows the connection to the right of the two occupancy detectors of the LB100. Of course, you can also use the left detector. Figure 6 shows the connection to the occupancy detector LB101. Here, you can also choose between the left and the right detector. You can use the free detector of the LB101 to monitor a different part within the reverse-loop area.

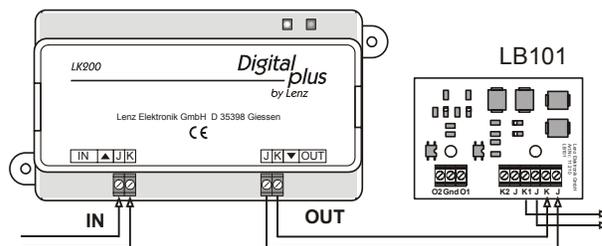


Figure 6: Connecting the LB101 to the LK200

Monitoring the reverse-loop area with a RailCom address display LRC120

If you want to use an address display LRC120 within the reverse-loop area, connect the LRC120 input to the output of the LK200.

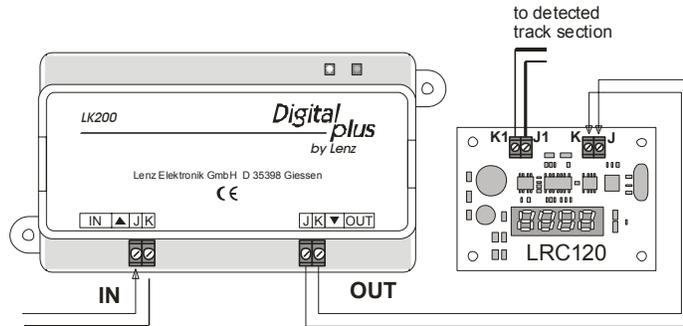


Figure 7: Connecting the LRC120 to the LK200

Reverse Loop User tips

The LK200 can be used in both simple and very complex reverse loops such as "dog bones", wyes, and turntables without any problems.

Please note that the reverse-loop area marked in grey in the following figures (which is the area controlled by the LK200) must always be long enough to be able to accommodate in its entirety the longest train operating on the layout.

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Dog bone

Figure 8 illustrates the positioning of the reverse-loop areas if the track is shaped like a "dog bone". Note that there are two reverse loop areas: one at each end of the "dog bone".

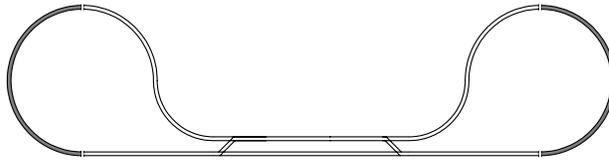


Figure 8: Reverse-loop areas within a "dog bone"

Staging tracks within a reverse loop

Only one train should be located in the reverse-loop area. If you want to assemble staging tracks in a reverse loop area, the reverse-loop area should be moved before or after this section.

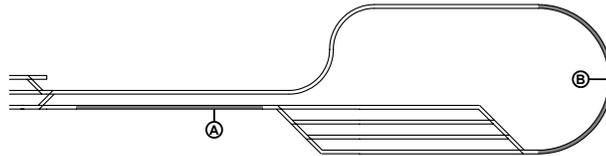


Figure 9:
Reverse-loop areas before and behind staging tracks
in a "dog bone"

Advice:

Either chose the reverse-loop area to be before **(A)** or behind **(B)** the ladder track of the staging tracks.

Wye's

Figures 10 and 11 show two alternate ways to position of the reverse-loop area within a wye.

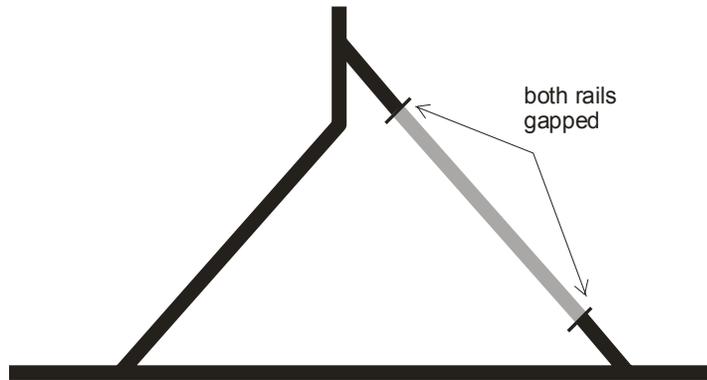


Figure 10: Reverse-loop area within a wye

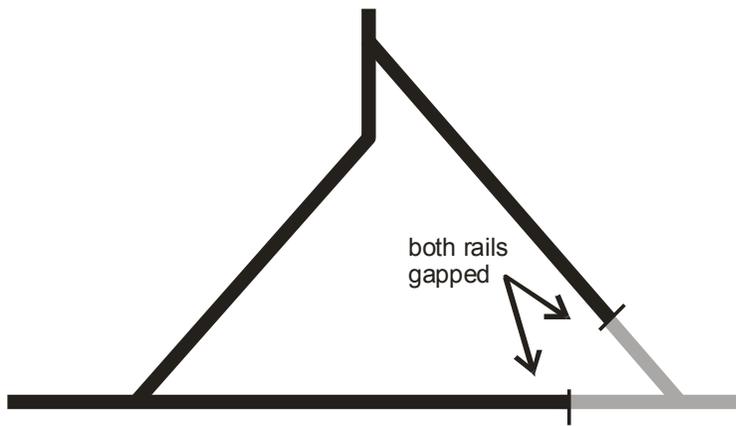


Figure 11: Alternate reverse-loop area within a wye

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Turntables

In DC operation it is common to only power the tracks that lead up to the turntable. The other tracks connected to the turntable are only supplied with power if the turntable is aligned to that track.

In digital operation, it is desirable to power all tracks so that it is possible to leave on the sound, lights and or the smoke generator while the locomotives are in the engine facility.

When you power all the tracks and rotate the turntable by 180°, a short circuit will be created between the turntable and the connecting tracks at the track exits. To avoid this, the track on the turntable can be managed by an LK200. Wire your roundhouse area in the manner illustrated in Figure 11.

The track exits shown in the Figure are available as accessory for the respective turntable. Isolate on both sides at the rail joints to the track exit and supply the turntable with the LK200.

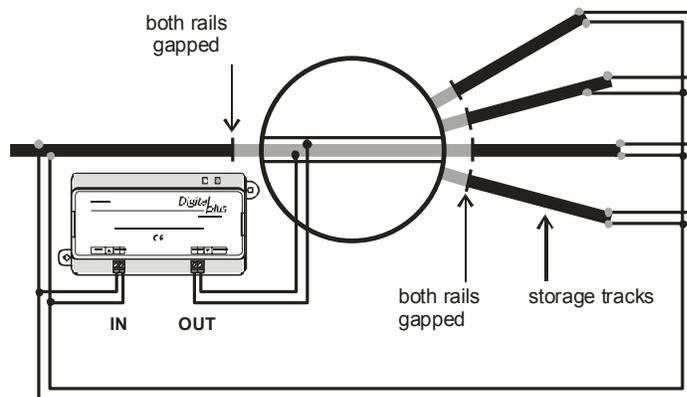


Figure 11: Wiring a turntable

When a locomotive moves on the turntable and is turned by 180°, a short circuit will be created in the track connections when the locomotive moves off the turntable, because the polarity of the turntable track and the track connection no longer match. The LK200 detects this short circuit and the polarity of the turntable track is reversed automatically.

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North American Warranty

Lenz GmbH does everything it can do to ensure that its products are free from defects and will operate for the life of your model railroad equipment. From time to time even the best engineered products fail either due to a faulty part or from accidental mistakes in installation. To protect your investment in Digital plus products, Lenz GmbH offers a very aggressive 10 year Limited Warranty.

This warranty is not valid if the user has altered, intentionally misused the Digital Plus product, or removed the product's protection, for example the heat shrink from decoders and other devices. In this case a service charge will be applied for all repairs or replacements. Should the user desire to alter a Digital Plus Product, they should contact Lenz GmbH for prior authorization.

Year One: A full repair or replacement will be provided to the original purchaser for any item that has failed due to manufacturer defects or failures caused by accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay for shipping to an authorized Lenz GmbH warranty center.

Year 2 and 3: A full replacement for any item will be provided that has failed due to manufacturer defects. If the failure was caused by accidental user installation or use, a minimal service charge may be imposed. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

Year 4-10: A minimal service charge will be placed on each item that has failed due to manufacturer defects and/or accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

Please contact your dealer or authorized Lenz GmbH warranty center for specific instructions and current service charges prior to returning any equipment for repair.

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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!

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