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Operating Manual for

Reverse Loop Module MX7 and MX7/3

Microprocessor controlled version, from Ser. #51000, suitable for all data formats

1. Introduction

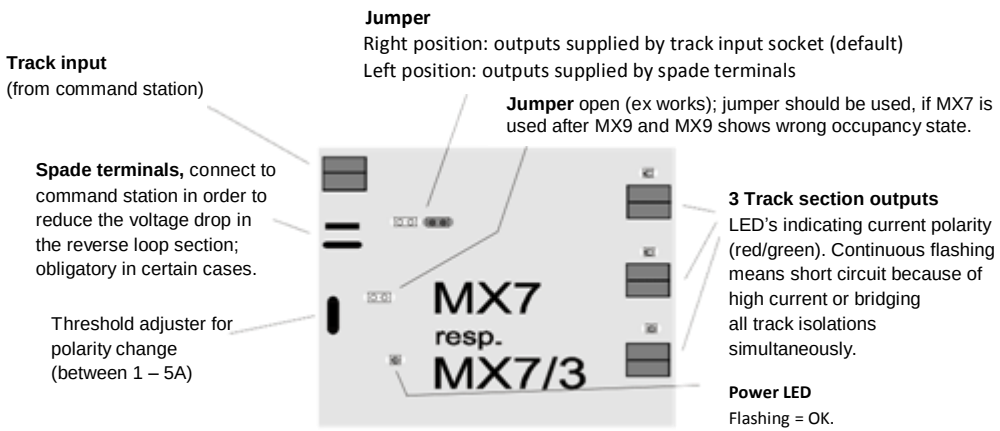
Reverse loop modules MX7 or **triple reverse loop modules MX7/3** ensure unhindered two rail track operation in conjunction with reverse loops, wye's (triangular junctions) and similar track configurations.

MX7 and MX7/3's are suitable for **all applications with ZIMO command stations** that is, for all available data formats managed by ZIMO systems (DCC, Motorola and the "old" ZIMO data format).

No experiences about the suitability of the reverse loop modules MX7 and MX7/3 in conjunction with third party systems (Lenz, Digitrax, etc.) are available at the present time (December 1998).

The principle of the Zimo reverse loop technique is to match the polarity of isolated "reverse loop sections" to the track polarity outside the loop in microseconds, the instant the gaps are bridged by wheel sets.

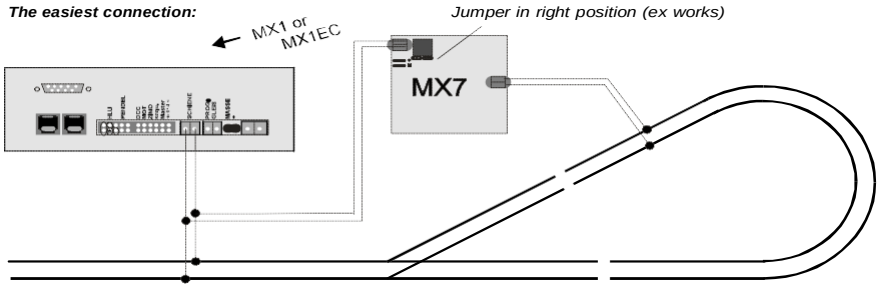
The **triple reverse loop module MX7/3,** which can operate 3 reverse loops, is intended for reverse loops that are too short to hold a full train length, due to space limitations (see chapter 4). The MX7/3 can of course also be used for three independent reverse loops.

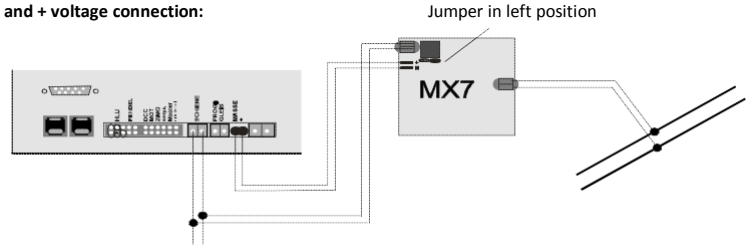


2. Technical Information

Track power ..... 3 A (Short circuit protected)

3. Connecting the MX7





The connection differs from the above diagram when using the "old" ZIMO data format (MX1/MULT, MX1/Z):

The + voltage wire shown above must not be used and the jumper must not be in the left position! Of the two wires shown, only connect the ground wire and use the jumper in the RIGHT position.

Purpose and use of the spade connectors and jumpers:

The two spade terminals (polarity sensitive!) can be connected with the command station's DC output. The GROUND connection is always beneficial and recommended. The "+" connection is also advantageous in most DCC applications (but not always - see Chapter 5!):

Using **both spade terminal connections** (pictured left, center) and also moving the **jumper to the LEFT position** has the advantage that the voltage in the reverse loop matches the voltage outside the loop (which connects the spade terminals directly with the output drivers). This avoids the typical speed reductions and headlight dimming's that occur otherwise.

Current threshold adjustments (change-over sensitivity and short circuit detection):

The two potentiometers can be used to adjust the current thresholds that must be exceeded when the rail gaps are bridged by the wheels so that the polarity is reversed in the reverse loop (this is also the over-current limit). The upper of the two potentiometers (the middle one of a total of three available) allows the current measurement adjustment from 1 A to 5 A (clockwise) between the track outputs and the operating voltage (positive); the lower potentiometer between the track outputs and ground.

In most cases, the default setting can be left as is. If, in exceptional cases (e.g. long wires), the polarity does not reverse because the short circuit current is too low, the threshold setting can be reduced to a lower current by turning the potentiometer to the left (down to 1 A), which increases the sensitivity. It is almost always advisable to adjust both potentiometers in parallel.

On the other hand, it may be necessary to reduce the sensitivity by turning the potentiometer to the right (increasing the threshold) when large locomotives cause very high current pulses resulting in the wrong track polarity or tripping the overcurrent shut-off (i.e. LGB engines with MX69x in the low frequency mode or third party decoders)

The description above is only valid for MX7's with serial numbers from 60900 to 399000. Current models have only one potentiometer for setting the current threshold!

4. Application and wiring of the MX7/3

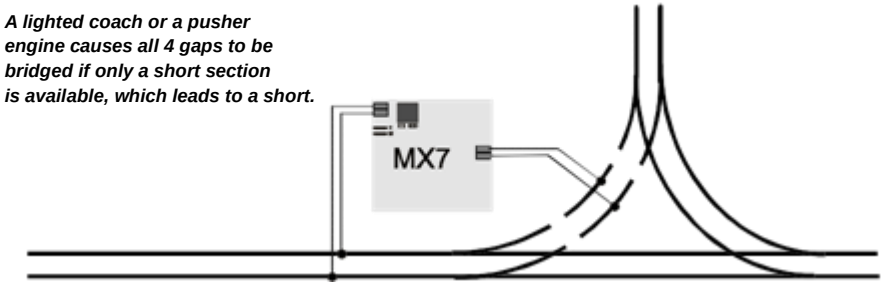
It is essential for the proper functioning of an MX7-controlled reverse loop that only one track separation of the reverse loop section is bridged at a time but not both; the latter would result in a short circuit on the main track. This requires a reverse loop section that is at least as long as the longest expected train, especially when the axles of the cars/coaches are electrically "connected" with each other.

For cases where such a long reverse loop is not possible, as is the case with a **wye,** the **triple reverse loop module MX7/3** can be used.

This allows the use of 3 reverse loop sections, which are to be arranged so that simultaneous bridging of all four track gaps is as unlikely as possible. The following layout has proven itself: the **center section** in the length of the longest locomotive or consist (approx. 40 cm / 16 inches) in length and the **end sections** as long as the bogies (HO: about 5cm / 2 inches).

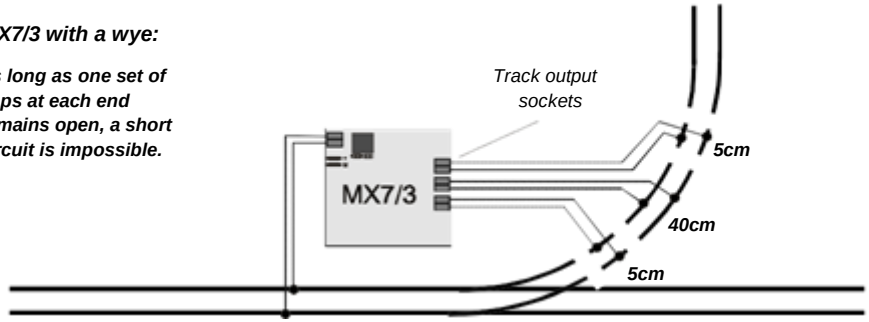
MX7 with a wye:

A lighted coach or a pusher engine causes all 4 gaps to be bridged if only a short section is available, which leads to a short.



MX7/3 with a wye:

As long as one set of gaps at each end remains open, a short circuit is impossible.



5. Reveres loops with occupancy detection

Layouts equipped with train protection also require occupancy state information from the reverse loop in order to apply the “signal controlled speed influence”.

To make this possible, ZIMO MX7 (and of course the triple variant MX7/3) are designed so that a combination with the **track section module MX9** is possible that is, that the MX7 input socket (on the left) can be connected to one of the MX9 track section outputs.

What makes this possible is that the **power supplied to the MX7** comes **through the two spade** terminals (jumper in RIGHT position!), which does not cause a current draw on the track input line that would be interpreted by the MX9 as “section occupied”.

The **occupancy detection threshold** can be adjusted with a potentiometer (available only from Serial No. 60900; the uppermost potentiometer, just below the GROUND spade connector) if occupancy is shown despite an empty track section or the section is not shown as occupied when in fact it is.

Note: It is not always possible to fine-tune this setting to the extent that even axles equipped with resistors are triggering the occupied state. In many cases, only coaches (with working lights) and engines are recognized.

6. The MX7 as a Mini-Booster !

The core of the reverse loop module is to reproduce the DCC signal, along with the added short-circuit induced polarity reversal. It can therefore be used to supply power to any other section of a layout, not just a reverse loop.

The energy can be supplied to the MX7 through the spade terminals from an external power supply (with an output voltage equal to the desired track voltage, ensure correct polarity!). The track input is connected to the MX1.

NOTE: The use as a mini booster is only possible for the DCC data format (i.e. only with MX1/N, but not with MX1/MULT or MX1/Z).