

Comparison Tortoise™ vs Switch Tender™

Micro-Mark® has been attempting to get into DCC and the specialty model railroading electronics markets. Their recently introduced Switch Tender™ switch machine, offered to compete with the Circuitron Tortoise™, is a good example.

In summary, this comparison review clearly and factually indicates that the Switch Tender does not compare favorably with the Tortoise™.

During the review process we contacted Micro-Mark to confirm or dispute our findings. No one could provide any technical support for the Switch Tender or any DCC applications.



Review

Micro-Mark has released a new slow motion switch machine, the Switch Tender, to directly compete with the Circuitron Tortoise™. Based on a direct comparison the Switch Tender fails to meet the standard of quality the Tortoise™ has established as the most popular switch machine on the market.

One benefit of the Tortoise™ is that a large number of them can be used on a DCC layout without much consideration to current draw. The Switch Tender, however, requires significantly more power. Using the supplied 150 ohm resistor, I read a stall current of 65 ma using a regulated 12 volt supply. This is about four times greater than the Tortoise™. Also, current draw during the duration of the throw measured about 26 ma., about eight times greater than the Tortoise™. So, for a 50-switch machine layout, the Tortoise™ would need less than a 1-amp power supply, the Switch Tender would need about 3.25 amps. The high current draw of the Switch Tender also eliminates the possibility of wiring LEDs directly in series with the motor for panel indications (see Tortoise™ Application Note AN6000-07), another convenient feature of the Tortoise™.

We wondered if the Switch Tender motor would run with a higher value resistor in series (which would cut the current), but increasing the resistance to even 300 ohms (which would have cut the current in half) resulted in a motor that would not start at 12 volts. This is likely due to the inefficient motor used, which has a very high "breakaway" torque. Apparently, they have selected their resistor to provide the minimum value of protection to a stalled motor, which was not designed to be stalled, while still providing enough current to overcome all the frictional losses in the mechanism.

Due to the higher current draw the Switch Tender is not a good option to work with DCC stationary decoders designed to power stall-motor type switch machines. They have a very limited current output (keeping the cost reasonable!) and certainly do not have enough drive to power the Switch Tender.

The most significant problem we see with the Switch Tender and the reason that the Tortoise™ addressed 15+ years ago (and for which Circuitron received a patent) is that you cannot directly couple the torque of a gear motor to the points of a model turnout --- not and expect them to hold last long, that is! The Tortoise™ utilizes a special custom designed DC motor that generates very low torque at stall. This is combined with a reduction gear train that "can" provide up to a pound of thrust if needed. However, the design of the Tortoise™ limits that thrust by nature of the included linkage and the positive gear train "stops" built into the case (one of their patented features). As a result, the switch points never "see" more force than is necessary to actuate them properly and safely. The Tortoise™ can be used with all scales from G down to Z and is safe and effective with all forms of hand-laid trackage.

We measured the thrust of the Switch Tender using the supplied brass wire. At a typical mounting height under the layout, it generated a pretty hefty 5.5-6.0 ounces of thrust. That's a lot of force having to be absorbed solely by the points. The Tortoise™ will supply what is necessary, of course, but a typical HO installation will result in less than 1 ounce of force.

Finally, the Switch Tender completely ignores the need to provide switching contacts built into the machine for frog or signal powering. They suggest using a 3PDT switch and wire the frog through the extra contacts. If the Switch Tender is used with any turnout where the points normally provide power to the frog (such as older Shinohara or Micro-Engineering), you will have an instantaneous short every time

you throw a toggle. This further demonstrates the Switch Tender's incompatibility with DCC.

The Switch Tender lacks many of the features that model railroaders have come to expect from the Tortoise™, and lacks compatibility with DCC stationary decoders. It seems Micro-Mark overlooked the needs of the current model railroading community when they designed this product, and instead released a switch machine that costs less than the Tortoise™, but unfortunately, does much less. Let the buyer beware!