



The SAN-OMNI Blue Point Pulse Width Modulated (PWM) Dual Heater switch heating system is an autonomous system that allows for the correct amount of power/temperature to be applied to switch heaters, based on weather conditions, to melt snow – even in the most adverse conditions. This system is totally autonomous, “Man Out Of the Loop”.

The system is unique in that it monitors weather conditions (precipitation, temperature, wind, ...) along with hot and cold rail temperatures. This combination of sensors allows the system to apply the proper amount of power to achieve an acceptable rail temperature to melt snow and keep the switch tracks and switch rods clear of snow.

This unique monitoring of the system is further enhanced by applying a Pulse Width Modulated (PWM) algorithm and circuitry to the switch heaters that allows for power, heat, to be applied to the heaters in lesser amounts than a fully ON condition. The switch heating PWM algorithm and circuitry is currently patent pending in the U.S. and Canadian Patent offices.

Blue Point switch heating PWM allows for the use of dual switch point heaters that are applied according to the severity of the weather conditions. The nominal energy used would typically be 50%, or less, duty cycle on each of the two switch point heaters, 250 watts per foot or less.

Should a severe storm occur, such as a blizzard or N’or Easter, the system has the ability of applying up to 100% duty cycle on both heaters to achieve wattages of 500 w/ft. This is a substantial amount of energy/heat to be applied to the rail. Keeping this amount of wattage/temperature applied to the rail for long periods of time could be dangerous but fortunately the Blue Point system will only keep this extreme heat mode on during the adverse event.

The autonomous nature, “Man Out of the Loop”, of the Blue Point system allows the system to react in concise terms to address all weather conditions while conserving energy when not needed. Keeping snow and ice from interfering with rail switch operations is the goal of the PWM Dual element Blue Point system.

Another unique feature of the Blue Point system is a mode called “Pre-Heat” mode. The Pre-Heat mode keeps the rail temperature above a certain cold temperature so that when a cold weather event occurs the system can attain melting temperature without waiting and extensive amount of time and possibly become ineffective.

Rail used on Amtrak switch turnouts is typically 136lb rail, 136 pounds of metal per yard – this equates to about 45 pounds per foot. This is a large heat sink that takes time to heat. Should this metal be very cold it may take too much time to heat to cover the weather event. The Pre-Heat mode keeps the rail temperature at some minimum temperature to avoid excessive wait times in extreme cold conditions and allow melting temperatures to be attained without serious delay. This is typically set at about 18

degrees Fahrenheit but is configurable to lower temperatures or higher temperatures.

The Pre-Heat mode does not take use appreciable more energy than a conventional system and provides a great level of assurance in attaining melting temperature quickly. This can be clearly shown in side by side tests using power meters. One such test showed the Blue Point energy savings, all power measured for an entire season, to be 80% more efficient than a human dispatch systems – this included Pre-Heat modes.