

SAN Electro Heat, a NIBE Railway Element company, has developed a powerful rail switch heating system that includes automated heating control with flat heaters that has been available in Europe for over 30 years.

The flat switch point heater, made with a Monel 400 alloy which is impervious to salt and most chemicals, is combined with a fully automated Blue Point Heating Control system.

We have taken this advanced European suite of products and introduced it to North America where we have redesigned it for the North American market, and we produce the products across varying voltages and wattage profiles. In addition, we have introduced Dual Heating Elements with Pulse Width Modulation (PWM) – recently patented, for the North American market.

The dual element deployment requires no additional trenching since the second pair of switch point heaters uses a smart junction box that breaks out the dual elements, and isolates them, at the turnout being addressed. This uses the existing heater power lines in place or one single line for a new system.

We first introduced the North American Blue Point system with Amtrak at the Reedville Interlocking, south of Boston on the Northeast corridor, in the 2017/2018 winter season.

Since then we have deployed systems at Amtrak Swift, outside of Penn Station NY, Amtrak Orms, Providence RI station, and several Amtrak interlockings on the Amtrak Empire line. We have also installed a DC system in Baltimore on the Maryland Light Rail system.

All these interlockings have run autonomously and addressed varying snow and ice conditions – in fact many blizzards and Nor’easters where dual heat was employed (>50% duty cycle).

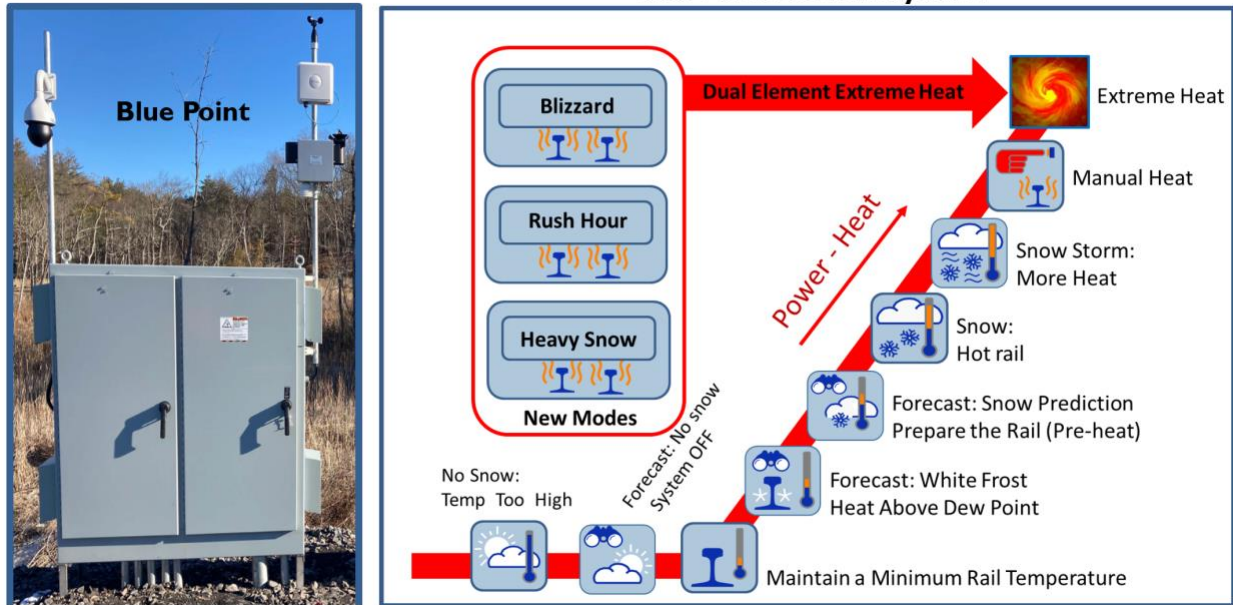
The Blue Point system is assembled and supported by Omni Control Technology, Inc. out of Whitinsville, Massachusetts.

**Some of the highlights of the Blue Point North American technologies are:**

- The Switch Point Elements are flat switch point heaters made with a helix internal heating element and a Monel 400 sheathing.
- The helix element allows for expansion and contraction of the element with minimal effect to the element versus a straight wire element (most common). This extends the life of the heater.
- The Monel 400 is an alloy used in undersea applications and is near impervious to salt and most chemicals. This also extends the life of the heater.

- The combination of these two design points allows us to provide a 10 year warranty on our heaters based on a Mean Time Before Failure (MTBF) of over 30 years.
- We have also developed a stainless-steel pan heater that uses the same heating elements described here. These elements are encased in a thin stainless-steel enclosure that is well protected and easily slides in under the switch machine rods.
- The Blue Point Control System allows for the automated operation of the heating system – “Man Out of the Loop”.
- The system uses an array of sensors, weather prediction, an advanced weather station and an intelligent RTU to automatically control the heating profile of switch heating according to the weather conditions at hand.
- It can be accessed directly or through a VPN cloud to view the SCADA system and, if desired, override it – this can be done locally at the enclosure.
- Dual element heaters or single element heaters can be employed. The dual element heaters can be modulated, Pulse Width Modulated (PWM) - patented, to provide extreme heat, as high as 600 w/ft, while keeping nominal wattage to a much lower profile according to weather conditions.
- Dual element heaters are unique in that they can both fit in the gap of a petti bone/AEREMA brace without touching each other. This would not be possible with other switch heating elements as the SAN switch heater dimensions are the slimmest in the industry and fit in the brace where larger heaters would not.

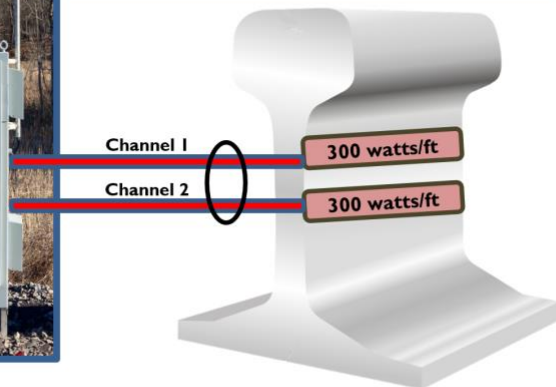
**Blue Point SCADA System**



**Pulse Width Modulation (PWM) (Patented) – Switch Heating**



**Dual Element – Power Modulation with Redundancy**



- Pulse Width Modulation (PWM) (Patent Pending) Regulates The Duty Cycle of the Heaters to Attain a Specific Wattage
- A Single Element may not Provide Enough Power for Extreme Conditions – Dual Elements Provide Extreme Power – up to 600 w/ft
- The Blue Point SCADA System will Regulate the Duty Cycle According to Need Based on Rail Sensors, Prediction and the Attached Weather Station
- Blue Point and PWM Provides for:
  - Extreme Heat When Needed
  - Nominal Energy Savings
  - A Redundant Heating Path
- Patent has been granted - PWM for Switch Heating

**Extreme Heat When Needed, Nominally Energy Efficient and Redundant Elements**