

# SAN<sup>®</sup>

Railway Systems



**ENERGY SAVING  
SMART WEATHER  
CONTROL™**

## TRAM LINE SWITCH POINT HEATING

### **50-80% Energy saving**

Heating controlled by weather conditions and weather forecast

### **Long life heating elements**

Shield material is Monel<sup>®</sup> to restrain the salty conditions for the point heaters

### **Increase traffic reliability**

Respond immediately to information about status, locale conditions, alarms and errors in the point heating system

### **No investments in new cabinets**

Control boards customer made to fit existing point heating installations

### **No new cables or wires**

Full wireless communication using proven secure GPRS technology.

### **Expand step-by-step**

Full scalable system, increase step by step. Installations from few switch points and weather station to thousands of switch points.

### **Access the system from anywhere**

Use existing IT infrastructure or use our hosted internet system.

## Complete line of products to an integrated Smart Energy Saving City Solution

From heating elements, heating control boards/cubicles to complete SCADA monitoring and control system. Delivery as components or as a complete integrated system.

SAN Railway System BLUE POINT avoids point heating burning 6-7 month a year... Many winter days are cold but no ice and no snow. System BLUE POINT controls the energy, so energy is only used when needed.

Focus on long lifetime and energy optimized/saving solutions.

- **Point heating elements** special designed to stand the extra harsh tramline conditions specially the salty water from de-icing the roads.
- **Heating control** boards or cubicles to fit existing installation or as complete new installations. Wired or wireless communication
- **Weather stations:** snow, air temperature, wind speed etc. to control heating as a function of the weather conditions.
- **BLUE POINT Supervision software** to monitor and control complete city installations.
- **Hosted BLUE POINT supervision system** offered by SAN. Access the installation from the internet. No need for investing in IT hardware. High level of security is part of the system.
- **Smart Weather Control™** Big energy savings and still prepared for snow. Weather forecast every hour analysed by the BLUE POINT Supervision system, prepares all points for snow.

### SMART WEATHER CONTROL™ PRINCIPLE OF THE SYSTEM

All point heating control cabinets are located close to the points. In the cabinet is the BLUE POINT controller board and a GSM antenna (for GPRS wireless communication).

Strategically around in the city is mounted a small number of weather stations measuring: Snowfall, air temperature, rail temperature\*, wind speed\* and Air humidity\* (\*=optional).

All point heating control cabinets and all weather stations are in wireless contact with the BLUE POINT server (Secure GPRS network).

If the conditions are right, the BLUE POINT server sends out order to heat, to all relevant point heating controllers.

The BLUE POINT server retrieve weather data from weather stations and receive weather forecast every hour for the locale area. Based on these informations the decision is made, whether or not to heat.

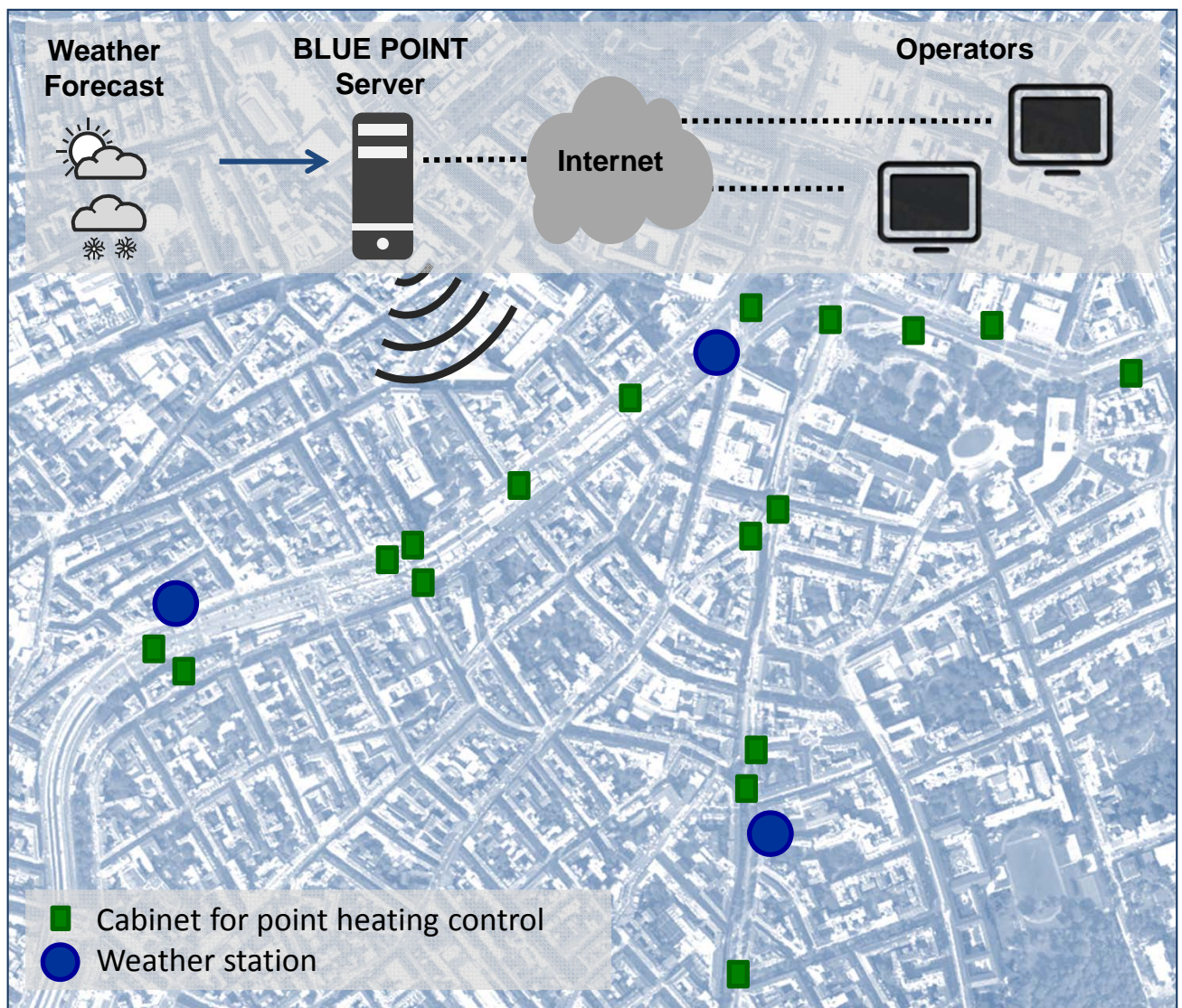
Any errors or alarms that occurs in any point heater controller or weather station are immediately reported to the BLUE POINT server. Critical alarms are send via e-mail to dedicated persons.

The operators can control and monitor the system from anywhere. The operator just need access to the internet.

The System gives an overview of the entire system, shows witch mode every controller is in, shows locale weather conditions, shows any error or alarms.

The system is fully automatic, but inside every cubicle there is a manual service switch. This switch could force the heating ON.

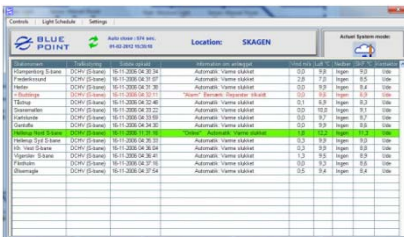
The operator also has the possibility to remotely force the system to heat.



### BLUE POINT SCADA - SCREEN VIEWS EXAMBLES

Easy table over view of all Cubicles in a city or territory. Information about locale weather conditions, last update time and information about which heating mode is active. Cubicles with faults and errors changes colour and an error message is displayed.

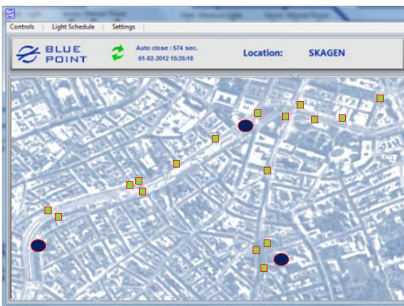
This screen also gives access to any of the listed cubicles for a closer look.



### CUBICLE OVER VIEWS

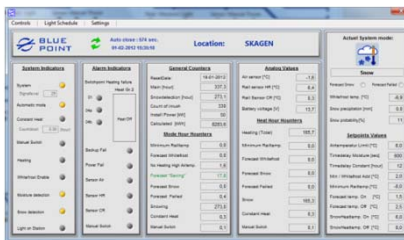
Easy table over view of all Cubicles in a city or territory. Information about locale weather conditions, last update time and information about which heating mode is active. Cubicles with faults and errors changes colour and an error message is displayed.

This screen also gives access to any of the listed cubicles for a closer look.



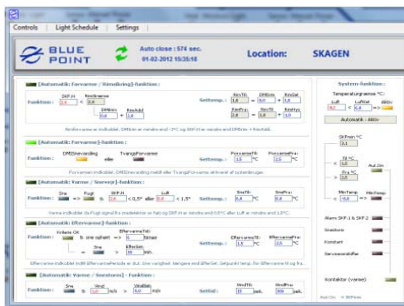
### WEATHER STATION & CUBICLE – CITY MAP

Easy over view of an entire geographical area. The map contains easy to see symbols for each cubicle and weather station. Weather data is displayed where they are measured. If an error occur the colour of the icon changes and/or is flashing.



### SINGLE CUBICLE OR WEATHER STATION - DATA

Behind every cubicle or weather station there is a more detailed information screen. All energy, and mode counters are displayed and light is showing status for every heating element for each switch point. Weather station information contain online weather data for this specific weather station.



### ADVANCED DATA & SETTINGS

The advanced data & settings screen makes it possible to adjust all triggers that brings the system into the different weather modes.

These settings can be done for the entire system or individually cubicle by cubicle.

Individual settings will optimize the system to match different weather pattern from area to area in the same city.



### DATA ANALYSIS

All data is stored in a database. The "Analysis" tap provides information about how power is distributed in the different weather modes, Historical temperature curves and event log about errors and modes.

These analysis is a great tool to fine tune the system settings for saving energy without compromising traffic interruptions.

The analysis can also show irregularities e.g. manual operation of the heat.

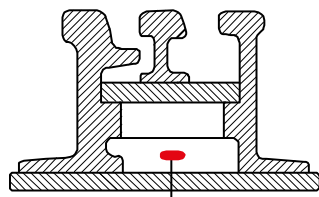
**SAN**<sup>®</sup>

Railway Systems

**Notes:**

### EMBEDDED SWITCH POINT HEATING

Cross-section A – B

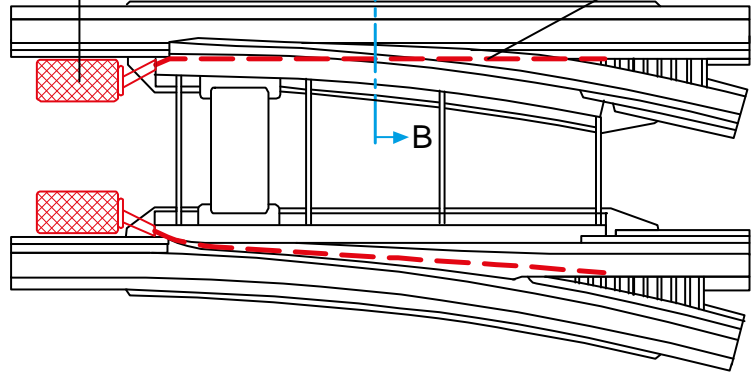


Heating element

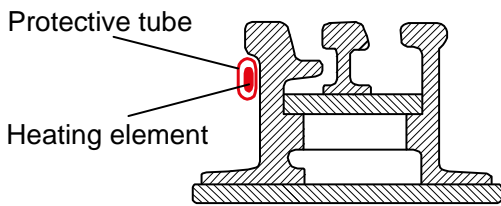
Heating element connection box

A

Heating element



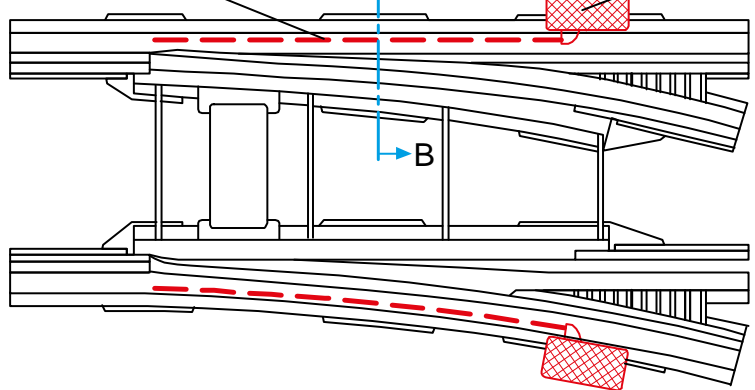
Cross-section A – B



Protective tube / heating element

A

Connectionbox



Junction and mounting box for heating element for an imbedded switch point

### SL - ELEMENT TECHNICAL

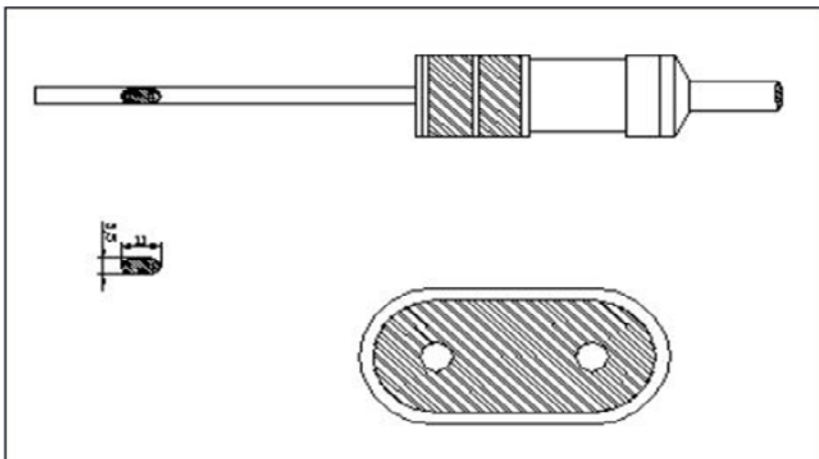
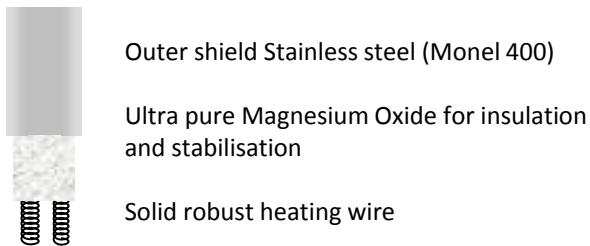
The SL series of flat-oval point heating element is designed to meet the extreme environment of a city road in white winter dress. The demand is a rugged, long life, reliable element.

The element jacket is made of Monel 400. This Nickel-Copper alloy is resistant to sea water and steam at high temperatures as well as to salt and caustic solutions. Conditions that are present when de-icing roads in a city.

Moisture intrusion is eliminated by the design: Connection head is soldered to the heating element. The PE barrel is thermo compatible with the resin. This is to prevent internal thermo cracking between materials expanding differently to temperature. A final hot-shrink sleeve covers the hole connection head from the beginning of the cable to the first part of the heating element

The heating wire is a solid wire wound in a spiral. The spiral is completely encapsulated in highly compressed ultra pure magnesium oxide. The heating element has been through a thermo cycle to reduce fragility.

The element can be bended on-site or can be delivered pre bended.



### KEY FEATURES

The SL series of heating element has the following key features:

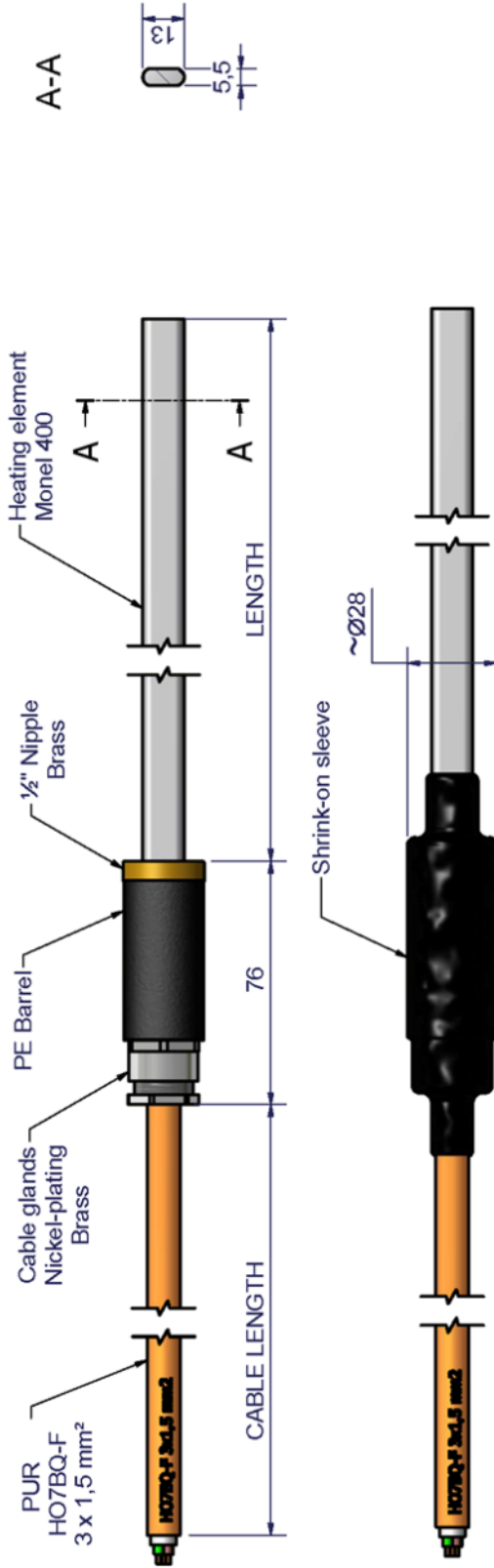
- **Resistant to mechanical chocks and vibrations**  
Long lifetime – good return on investment
- **High Power**  
High heating capacity for very challenging winter weather conditions
- **Corrosion resistant outer shield**  
MONEL<sup>®</sup> 400  
restrain the salty water from the de-icing of the roads
- **Completely sealed connection**  
No risk of malfunction due to moisture and termination corrosion problems.
- **Flexible length and shape**  
Made to fit the individual embedded points best possible
- **Optional: Multi zone heating**  
Increase the efficiency and saves energy

#### NOTE:

SL can be delivered with multi-zone power output. E.g. first half of the elements makes 300 W/m and the rest makes 500 W/m. This Has been delivered for switch points where higher power was wanted at the toe of the point. But the total available power was limited.

# Shape : S2 (Straight)

MODEL : SL - S2 - \_\_\_\_\_



### Heating Element Specification

MODEL: SL - S2 - L - XW - V - CZ - Y

- SL \_\_\_\_\_
  - S2 \_\_\_\_\_
  - L \_\_\_\_\_
  - X \_\_\_\_\_ mm  $\pm$  2%
  - V \_\_\_\_\_ W/m
  - Z \_\_\_\_\_ V
  - Y \_\_\_\_\_ m
- Y=Yes if something special apply

Total Power : \_\_\_\_\_ W  $\pm$  5%  
 Cable dimension: \_\_\_\_\_ mm<sup>2</sup>  
 OD cable size: \_\_\_\_\_ mm  
 Label LBL: \_\_\_\_\_

Barrel type: Water tight PE-LD  $\phi$ 28x76 Black / Shrink on sleeve  
 Cable type: PUR-cable  
 Element profile: SAN SL 13x5,5

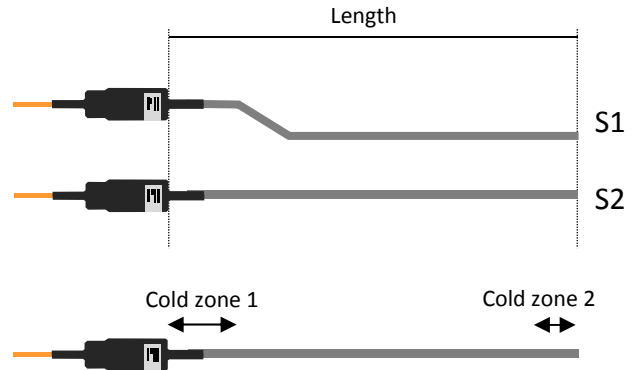
Machined		Material		Mass		Alteration		Rev.		Date		Made by	
ISO 2768 m								Dwg. no.					
Welded		Checked by		Date		Approved by		TA / SAN		Date		Project	
ISO 13920 BF		Date				Date						SAN <sup>®</sup>	
Tolerance		Item		Heating element for embedded switch points type SL		Electro Heat		www.san-as.com		1 / 1		CHANGE REV. A	

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 CHANGE REV. A.B.C. Internal Review. DA Issued for Review. DB, DC. Re-issued for Rev. 01 Issued for Construction. 02,03. Re-issued for Construction.

### SPECIFICATIONS TYPE SL

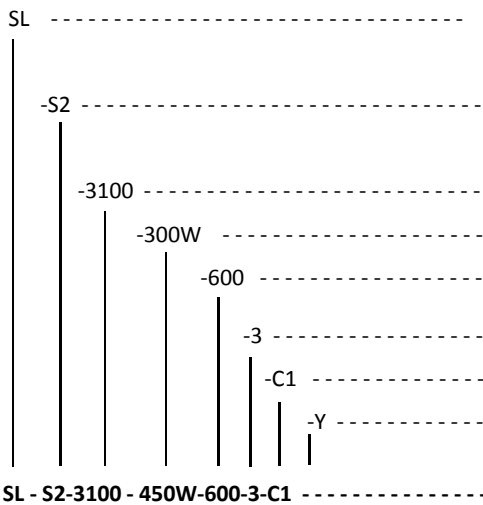
Output Power:	Up to 500 Watt/meter
Supply voltage:	40 to 900 V
Cold zone 1:	Typical 150 mm
Cold zone 2:	Typical 20 mm
Physical size:	
Heating element:	13 x 5,5 mm
Connection head:	OD 26 mm Length 76 mm
Heating element length:	Up to 6000 mm
Cable length:	To be specified
Cable connection:	Permanent molded
Cable type:	PUR H07BQ-F
Protection class:	IP65
Electrical isolation:	> 10 M Ohm
Outer shield:	Stainless steel MONEL <sup>®</sup> 400
Extra protection:	Hot-shrink sleeve

### SHAPES



The heating elements are pre-bended in 2 different shapes: S1 straight with offset and S2 straight  
Special pre-bended elements are available for a number of specific switch point types.

### MODEL SPECIFICATION - TRAMLINE POINT HEATING ELEMENT

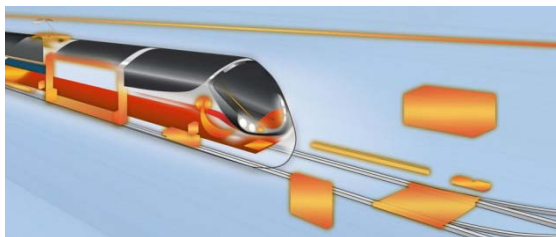


- Type of heating element  
SL (5x13 mm MONEL<sup>®</sup>400)
- Shape of the element  
S1, S2, S3....straight element as per drawing
- Length in mm (up to 6000 mm)
- Power output in Watt per meter (max 500W)
- Supply voltage
- 2 wire or 3 wire (earth connected to the element shield)
- Cable length in meters
- Y..... Yes, something special to add about this heating element

**SAMPLE MODEL: SL-S2 type heating element, Straight element 3100mm length, power output of 300 Watt per meter, 600 V AC/DC supply voltage, 3 wire cable, 1 meter of cable.**

#### SAN Electro Heat A/S (Member of the NIBE group)

Danish located international company offering more than 50 years of experience in development and manufacture of advanced technical electric heating solutions and components. Products are highly cost and energy optimized, and developed together with our customers. Our focus and know-how is divided into four business areas: Railway Systems, Wind Power, Process Heating and Heating Cables.



#### SAN - Railway Systems (Part of NIBE Railway Components)

Supply of complete systems, which secure optimum operation under any winter weather situations: Switch point heating, overhead wire de-icing and third rail de-icing. Our aim is to supply highly efficient systems that reduce energy consumption as well as the total cost of ownership. From heating elements through intelligent controllers to advanced server based computer monitor program. Including all necessary fittings, power transformers, weather stations etc. Rolling stock comfort heating, door step de-icing, heating of hydraulic systems, toilet/waste water systems and test load resistors.

Our design has proven its reliability through thousands of installations all over Europe.

#### SAN Electro Heat a/s - SAN Railway Systems

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