

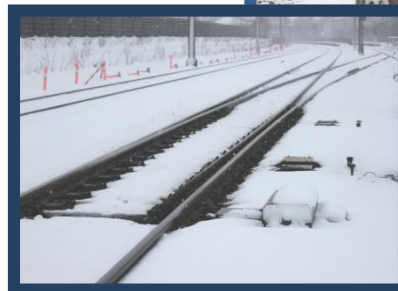
# Presentation of system:

## Electrical Switch Point Heating System

Complete energy saving systems to secure reliable railway traffic, through switch points in severe winter weather conditions.



BLUE  
POINT



# System advantages

- Energy savings from 25% to 70%
  - From Stand Alone to Forecasting
- Monitoring
  - Supervision of the entire territory
  - Heater or System Faults are Immediately alarmed to Personnel
  - Energy management
- Remote Control
  - Save money on site maintenance
  - On-line tuning of the system
  - Individual control parameters
- Traffic reliability
  - Quality components
  - System integration



# Blue Point Reference list, top 9

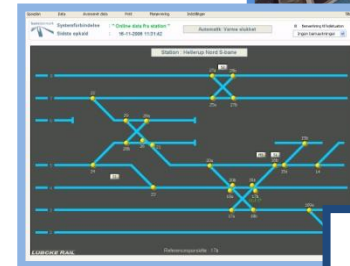
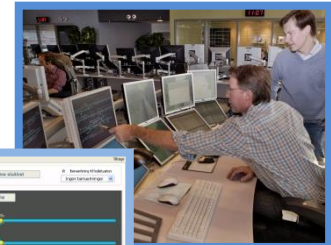
Customer	Country	Application	Power	First installation
Danish Railways	Denmark	Blue Point	300W/m - 50V	1978
Swedish Railways	Sweden	Heating + Weather stations	300W/m - 230V	1989
NSB	Norway	Heating + Control components	300W/m - 50V	1989
Network Rail	U.K.	Heating	200W/m - 110V	1990
ÖBB	Austria	Heating + Control components	300W/m - 230V	1999
Estonia Rail	Estonia	Blue Point	360W/m - 230V	2002
National Rail	Lithuania	Heating + control components	330W/m - 220V	2003
HZ	Croatia	Blue Point	330W/m – 230V	2014
PKP	Poland	Heating	300W/m – 230V	2010

# Blue Point Cloud Reference list

Customer	Country	Application	Weather forecast	installation
NJBA	Denmark	Branch line, 7 stations	Yes	2009
Oresund bridge	Denmark/Sweden	Complete land – tunnel – bridge switch point heating	Yes	2011
ÖBB	Austria	Test - 6 switch point	Yes	2011
Brixlegg	Austria	Private industry site	No	2009
Wiener Strassenbahn	Austria	Test Depot area	Yes	2011
ÖBB	Austria	Weather monitors	Yes	2011
Chicago	USA	Platform heating	No	2013
MVB	Germany	Tramline City solution	Yes	2014
Cph Metro	Denmark	Metro System	Yes	2015

# Solution components

- Heating elements
- Control cubicles
- Weather stations
- Monitor & control SCADA
- Power/safety transformers
- Consultancy services





# Multi Weather Modes

No Snow:  
Temperature too high

Forecast: No snow  
System OFF



Maintain a minimum rail temperature



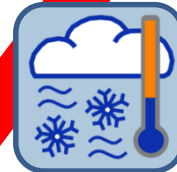
Forecast: White frost  
Heat above dew point



Forecast: Snow prediction  
Prepare the rails (Pre-heat)



Snow:  
Maintain hot rail



Snow storm:  
Maintain more hot rail



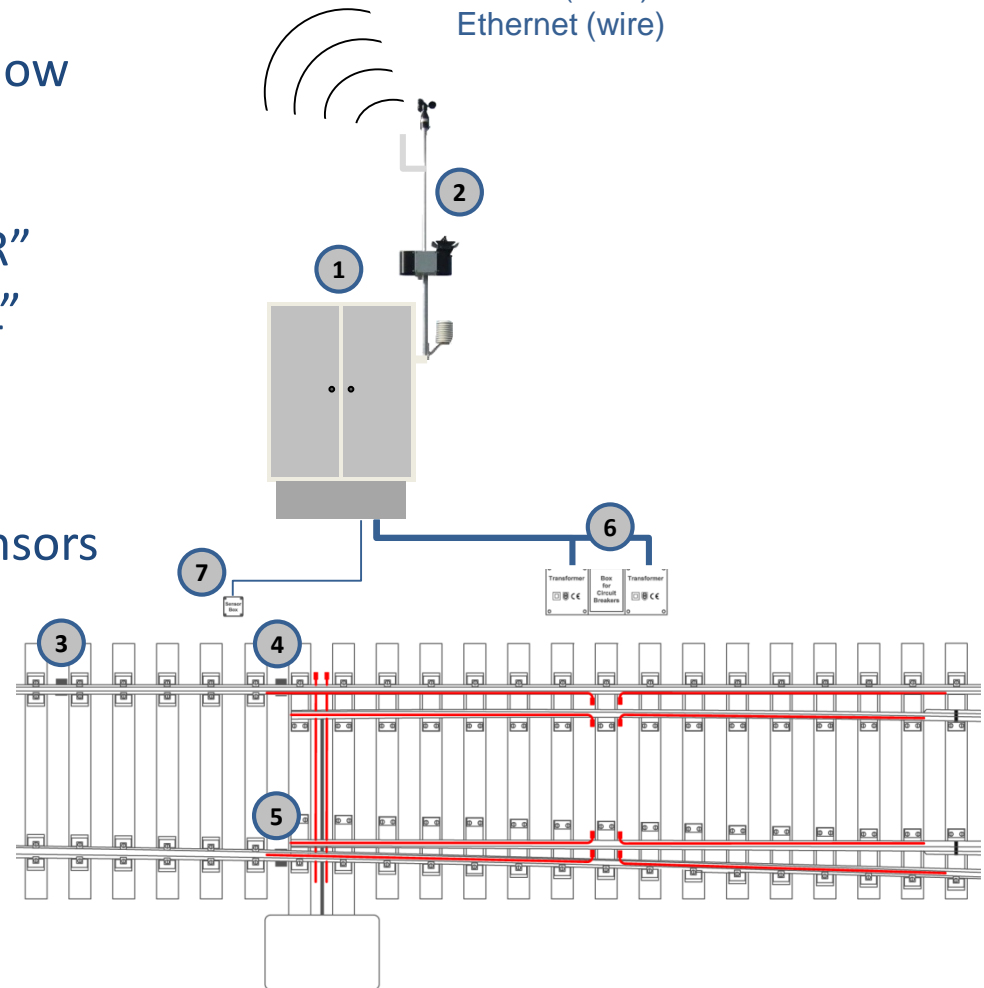
Manual heat

Energy

# Master switch point

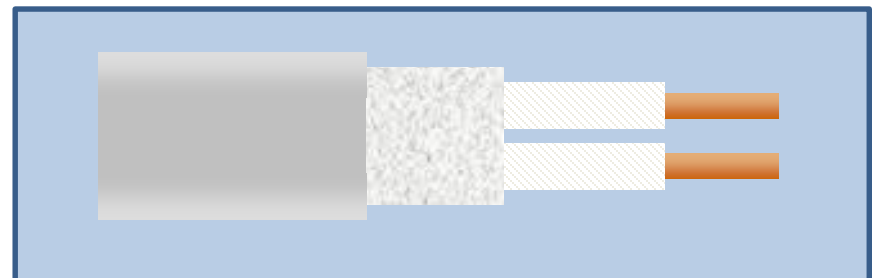
1. Master Control Cubicle
2. Weather station: Wind speed, Snow detector, Temperature and
3. Temperature sensor – Cold Rail
4. Temperature sensor – Hot Rail “R”
5. Temperature sensor – Hot Rail “L”
6. Safety/isolation transformer and/or power distribution box to heating elements
7. Junction box for temperature sensors  
Noise free: Pt100 to 4-20 mA

**Communications:**  
GPRS (GSM)  
RS485 (Wire)  
Ethernet (wire)



# High quality heating elements

- Increase energy saving
  - Flat shape maximizes surface contact
- Proven reliability & long life time
  - Monel 400 sheath impervious to salt & most chemicals – 10 year warranty
  - Designed specially for railway environment
  - Unique mechanical shock absorbent fibre glass wrap
  - Water Tight Sealed cable connection (IPx7/IPx8)
  - 500.000+ successful installations





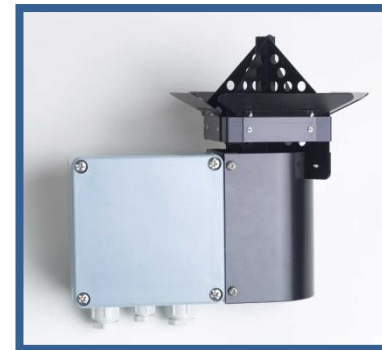
# Easy to install heating elements

- Fits existing power installation
  - Supply voltage supply from 48V to 750V AC & DC
  - Power up to 300 watts per foot
  - Lower wattage avoids track fires < 300 w/ft
- Easy installation
  - Stainless Steel Spring Clips – “kick-on” clips easy installation low corrosion
  - Custom terminations and connectors for any switch



# Weather Station Control

- Heat only when necessary
- Save 60 – 70 % energy, compared to manual systems
- Maintenance free weather station
  - Wind speed
  - Air temperature
  - Snow detector (precipitation)
  - (Air humidity)
- Hot & Cold Rail Temperature Sensors



# Master Control Cubicle

- Intelligent pre-programmed RTU
  - Energy optimized temperature settings
  - Multiple weather modes
- Control up to 8 switch points
- Connect up to 7 Slave Cubicles
  - Each slave controls and powers up to 8 switch points
  - Total up to 64 points
  - Perfect for Yards
- Input from:
  - Weather station
  - Cold and heated rail temperature sensor
  - Weather forecast



# Control – 4 main modes



## Forecast - No Snow

- Weather forecast has no snow warning out
- Switch points are switched off (Energy saving)



## Forecast - Snow

- Weather forecast has a warning out
- Switch points are pre-heated, ready to heat further



## Snow




- Snow or Ice rain detected
- Switch point heating to a higher temperature



## Snow Storm





- Snow is detected and wind speed is high.
- Switch point heating is 100%

# Control Modes 1:3

MODES – NO HEATING				
Mode	Icon	Trigger	Parameter	Aktion
Automatic OFF		Air temperature Or SCADA controlled	> 46F  Automatic OFF	No heat  No heat
Air Temp. High		Air temperature	> 43F	No heat
Forecast No Snow		Weather forecast	No Snow	No heat







# Control Modes 2:3

MODES – MEDIUM HEATING				
Mode	Icon	Trigger	Parameter	Aktion
Min. Rail temp.		Hot Rail	< 23F	Maintain rail at: 23F
Pre-heating*		Air temp.	< 37F	Heat rail to: 35F to 36.5F
Forecast SNOW		Weather forecast + Air temp.	Snow < 37F	Heat rail to: 35F to 36.5F
Forecast White frost		Weather forecast: Dew point:	White frost warning < 41F	Heat rail to: Dew point + : 35F

\*Pre-heating = Only if weather forecast is not active

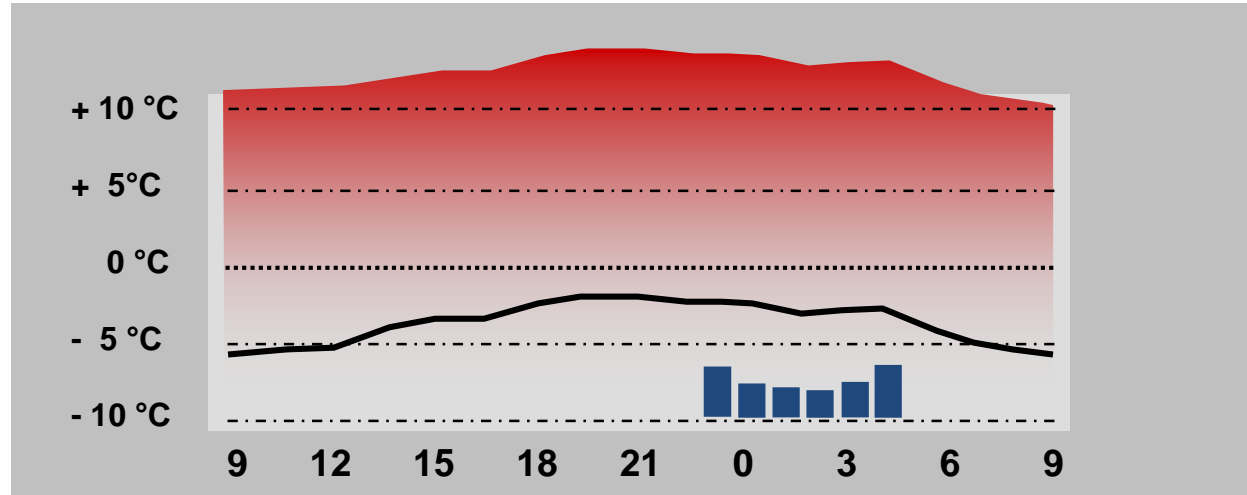
# Control Modes 3:3

MODES – HIGH HEATING				
Mode	Icon	Trigger	Parameter	Aktion
Snow		Air temp. Or Cold rail + Snow detector	Snow	Heat rail
Constant Heat		SCADA Activated "constant heat"	Active 12 hour timer	Heat rail: Max
Manuel ON		Control Service switch	Position "Manual"	Heat rail: Max  + Fail status
Snow Storm		Mode "Snow": + Wind speed	Yes  High	Heat rail: Max

## Always ON

Switch point heating  
turned on late autumn  
turned off mid spring.

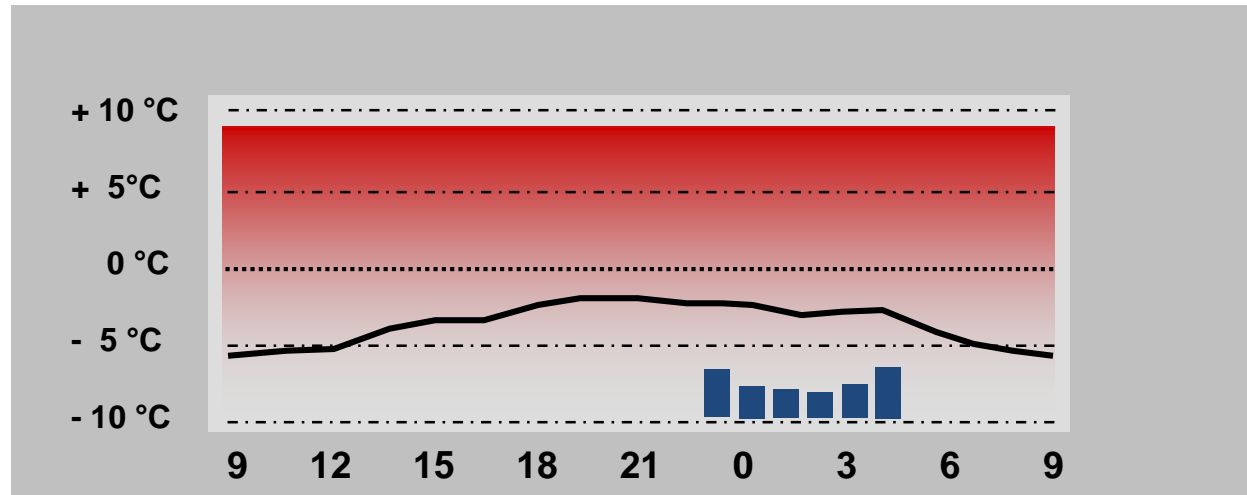
Energy saving 0 %



## Thermostat

Temperature feedback  
from hot rail.  
Temperature level as  
for “snowfall”

Energy saving 25 %



## Weather station

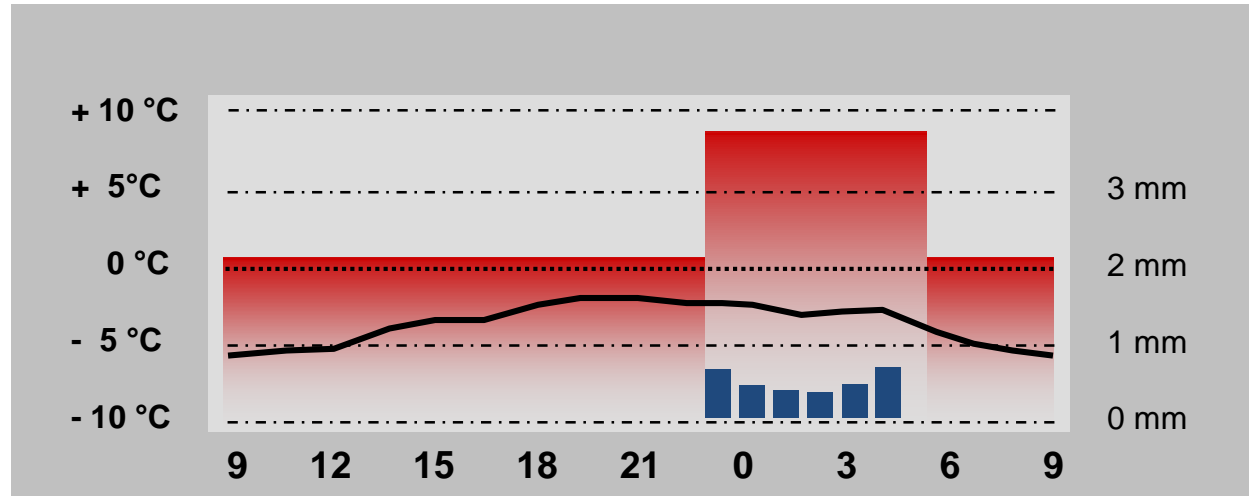
Heating controlled by  
Air + rail temperature  
+ snowfall detection

**Energy saving 51 %**

(from always on)

**Energy saving 35 %**

(from "Thermostat")



## Weather forecast

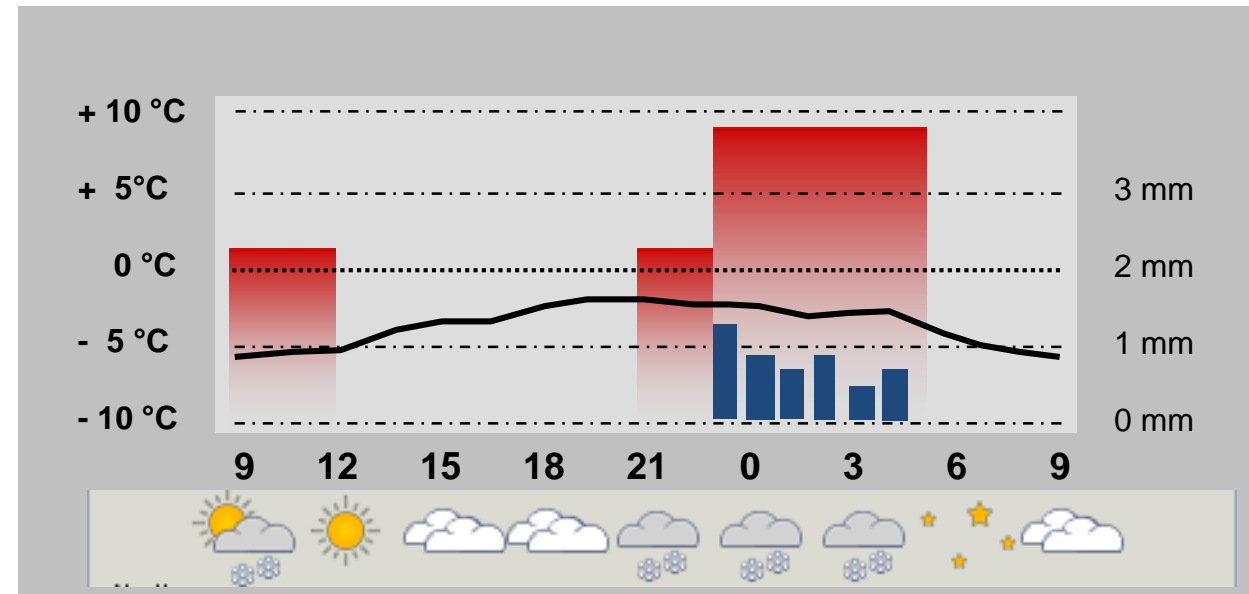
Heating controlled as  
"Weather station" +  
incoming weather  
forecast

**Energy saving 71 %**

(from always on)

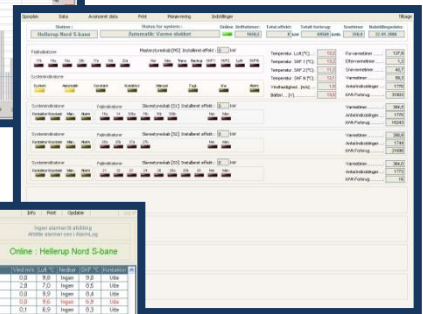
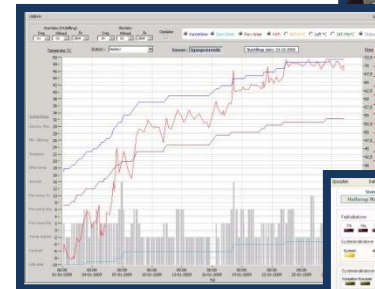
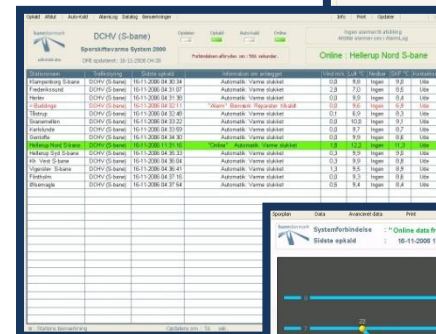
**Energy saving 41 %**

(from "Weather station")

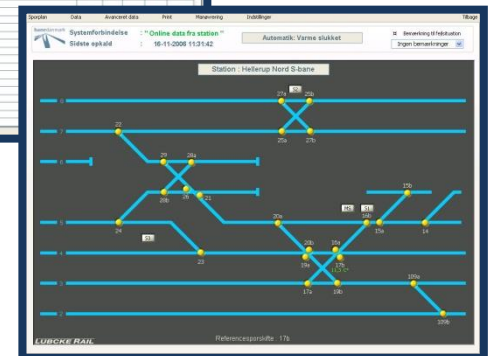


# SCADA Monitoring & Control

- Reliable winter traffic
  - Instant messages for heating errors
- Analyze and Save Energy
  - Optimize settings based on historical information
- Reduce Maintenance Cost
  - Prioritize and bundle incoming services
- Instant status of all cubicles and switches
  - Change settings in seconds

System	Component	Status	Value	Unit	Alarm
Heating S-Base	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
Heating S-Base	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK
	Heating S-Base	Online	10.11.2008 04:31:24	°C	OK

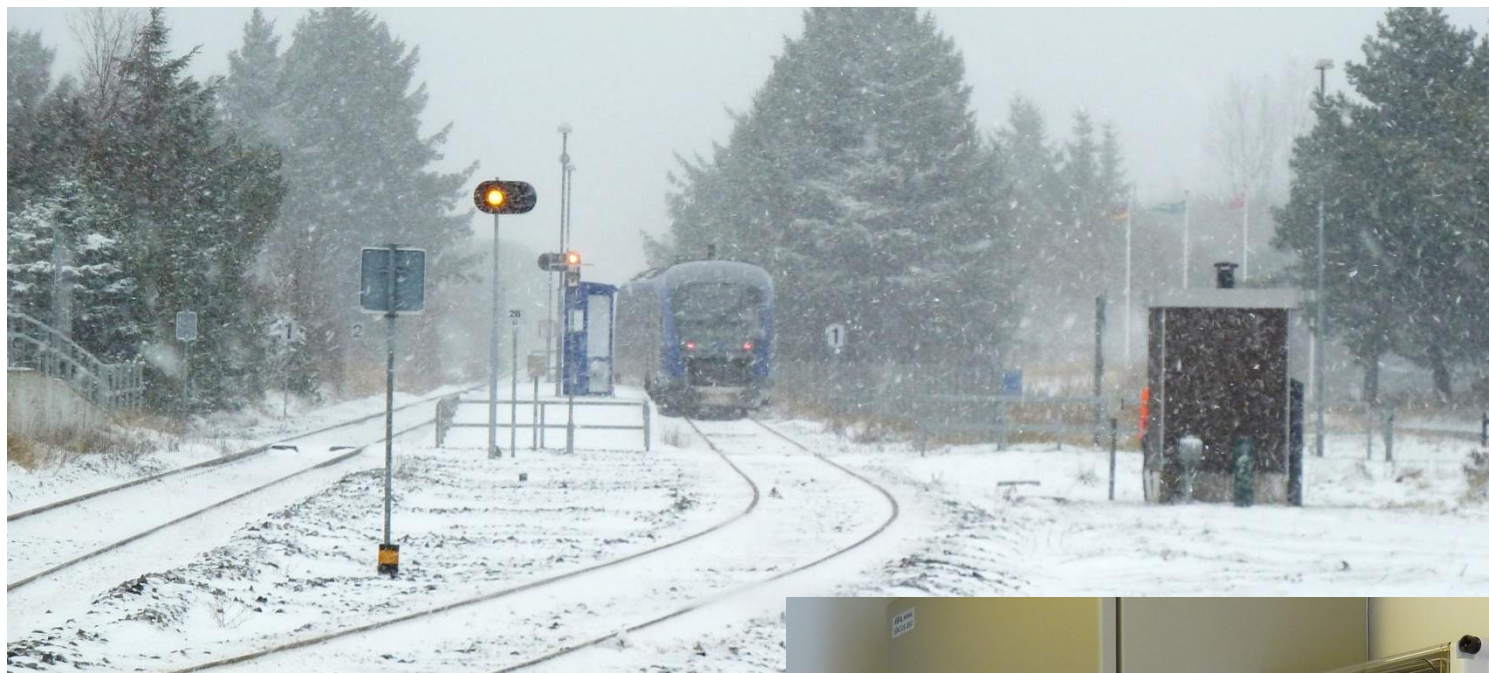




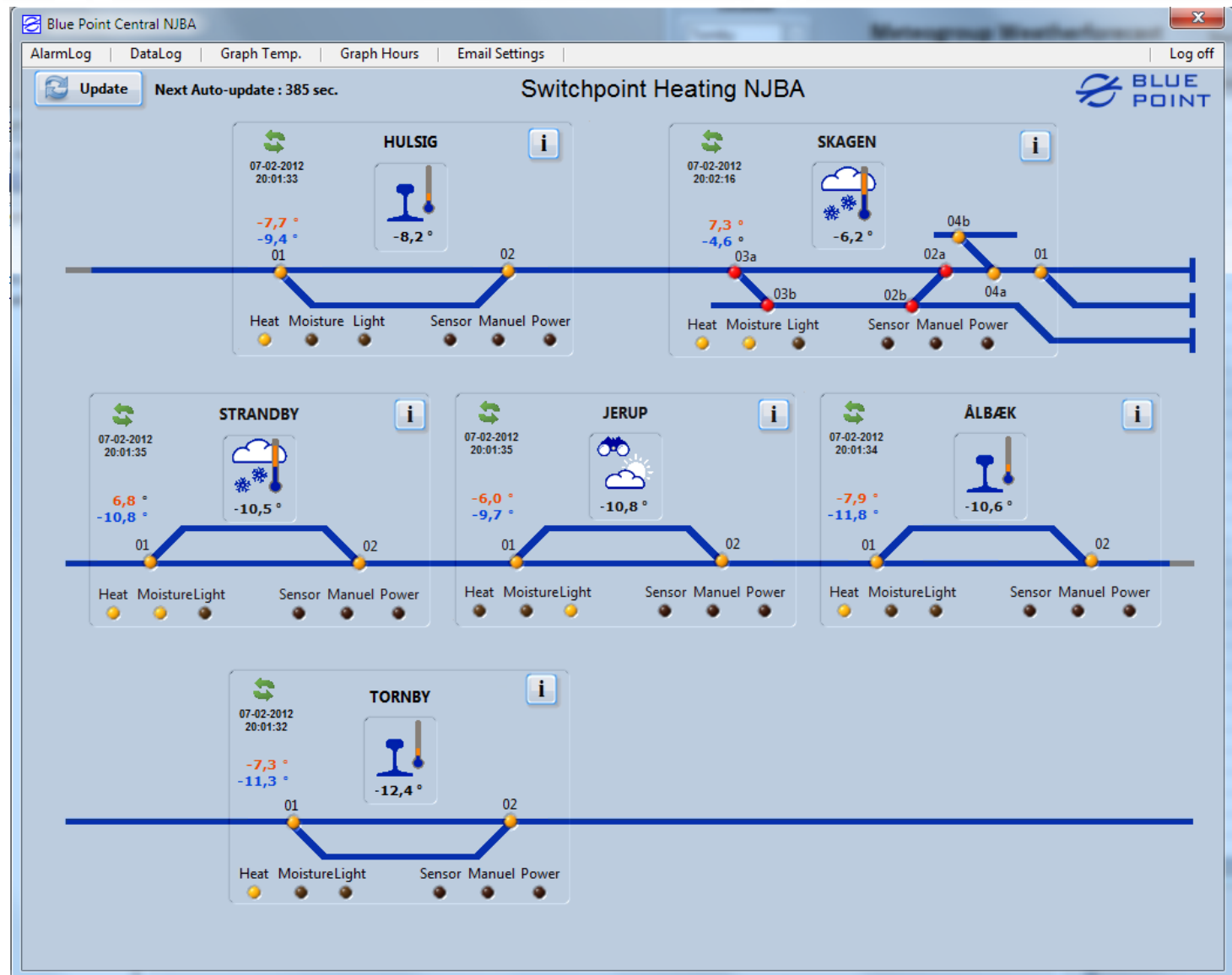
# Branch Line BLUE POINT SCADA









First page  
overview



## Location overview (typically a Station)














Auto close : 574 sec.  
01-02-2012 15:35:18




Location: SKAGEN

**System Indicators**







System 
Signallevel 
Automatic mode 
Constant Heat 
Countdown  [hour]
Manuel Switch 
Heating 
Whitefrost Enable 
Moisture detection 
Snow detection 
Light on Station 

**Alarm Indicators**

Switchpoint Heating failure  
Heat Gr.2

01 
04a 
04b 

Heat Off

Backup Fail 
Power Fail 
Sensor Air 
Sensor HR 
Sensor CR 
Manuel Switch 

**General Counters**

ResetDate: 
Main [hour] 
Snowdetection [hour] 
Count of inrush 
Install Power [kW] 
Calculated [kWh]

**Mode Hour Hounters**

Minimum Railtemp 
Forecast Whitefrost 
No Heating High Airtemp. 
Forecast "Saving" 
Forecast Snow 
Forecast Failed 
Snowing 
Constant Heat 
Manuel Switch


**Analog Values**

Air sensor [°C] 
Rail sensor HR [°C] 
Rail Sensor CR [°C] 
Battery voltage [V]

**Heat Hour Hounters**

Heating (Total) 
Minimum Railtemp. 
Forecast Whitefrost 
Forecast Snow 
Forecast Failed 
Snow 
Constant Heat 
Manuel Switch

Actual System mode:



Snow

Forecast Snow ☐ Forecast Failed ☐

Whitefrost temp. [°C] 
Snow precipitation [mm] 
Snow probability[%]

**Setpoints Values**

Airtemperatur Limit [°C] 
Timedelay Moisture [sec] 
Timedelay Constant [hour] 
Min / Whitefrost Add [°C] 
Minimum Railtemp.[°C] 
Forecast temp. On [°C] 
Forecast temp. Off [°C] 
SnowHeattemp. On [°C] 
SnowHeattemp. Off [°C]

**SAN** Electro Heat a/s



# Thank you for your time

