

## DRAWINGS & ORDER SPECIFICATIONS



## HEATING ELEMENTS RAILWAY SWITCH POINT HEATING (ELECTRICAL)

- ☞ **Unique vibration proof design**  
Solid straight inner heating conductor with a spun fibre glass insulation around.
- ☞ **Long lifetime**  
Excellent return on investment. Proven records of 30 years+. More than 15.000 installations in the rough railway environment.
- ☞ **Energy saving**  
Slim-line, flexible design to improve surface contact to rail. Elements for both stock and switch rail.
- ☞ **Standard or customized**  
Length up to 7,5 m, power up to 1000 W/m, voltage 48-240 V, pre bented to specific shape or tools to do it on-site.
- ☞ **Reduce safety malfunction**  
Dual insulation layer around the heating conductor secure no electrical shorts to outer shield.
- ☞ **Time Saving Installation**  
Easy clamp system and flexible heating elements reduces installation costs.

**No switch point heating system is better than the HEATING ELEMENT.**

Railways must run quickly, safely, punctually and economically 24-7. Interruption due to lack of performance on subsystems or components are not acceptable.

During wintertime switch points might fail due to accumulation of snow and ice typical between the stock rail and the switch point blade.

A "SAN Railway System" electrical heating element is designed specific to solve these problems. The flexible flat stainless steel element withstand the harsh environment associated with train traffic for instance corrosion problems and vibrations. The single ended connection is totally sealed to avoid any moisture problems.

The heating elements is produced in various sizes, shapes, length, electrical compatibility, energy intensity, insulation grades and outer shield material. All depending on the actual locale demands and conditions.

The economical cost of railway traffic interruptions clearly calls for high quality reliable systems and components.

### DESIGNED FOR RAILWAY ENVIRONMENT

The railway environment is known as a very rough environment.



#### The atmosphere:

The atmosphere in contact with the element is a combination of iron dust, iron oxide, oil, grease, acid rain and railway chemicals (herbicides etc.). This in combination with changing temperatures and humidity creates a very corrosive environment.

#### The physics:

The railway rails are exposed to very heavy physical stress that creates different kinds of mechanical shock and vibrations. When a train passing the switch, fast or slow, heavy cargo trains or high speed trains they all makes the rail vibrate. During maintenance of the rail body e.g. grinding and when changing/reorganize the ballast the rails are exposed to mechanical stress.

All the above mentioned conditions are the faced challenges when designing reliable components for the railways.

SAN Railway systems (SAN Electro Heat A/S) has more than 30 years of experience in this industry and ten thousands of installations that proves that our design meets the demands year in and year out.



### CONSIDERATIONS

Malfunction of a switch point normally means no traffic through this switch or no switch function before someone physically has examined and manually fixed the problem at the switch point. A very costly consequence caused by only a small amount of ice and/or snow.

Heating the rails in a switch point is done to avoid problems when ice or snow is accumulated between the point blade and the stock rail and/or ice is disturbing the locks and linkage to work properly.



Designing the right solution depends on multiple circumstances e.g.:

- **Winter Weather type.** Long winter with very low temperatures and a lot of snow, snow storms etc. or winters with a limited number of snow days.
- **Access to power.** How much power is it possible to get for the switch point heating.
- **Existing installation.** Electrical and perhaps mechanical compatibility with an existing installation.
- **Type of Turnouts.** Long high-speed turnouts or small radius side-track turnouts.

SAN railway systems has a deep knowledge about all these questions and will assist to design a cost and energy efficient system.



Snow /  
Ice Rain



Snow  
Storm



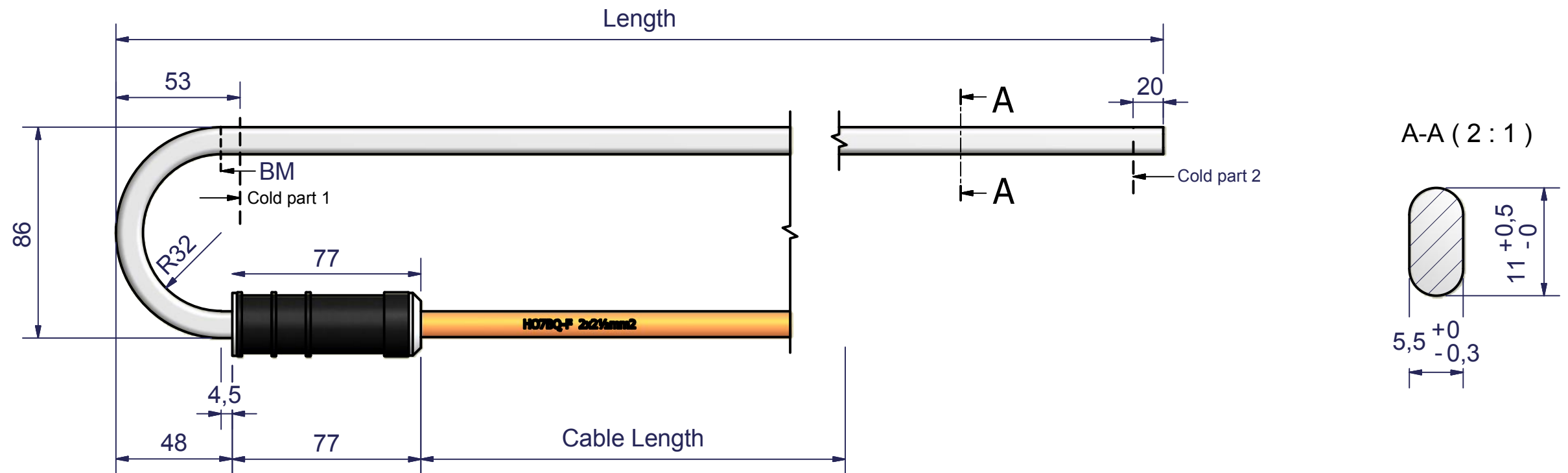
Snow  
Warning



White Frost  
Warning

MODEL : SSV - U1 - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

# Shape : U1 (Connection 180°)



## Heating Element Specification

MODEL: SSV - U1 - L - XW - V - CZ - Y

SSV	SSV	Type of heating element
U1	U1	Shape of the heating element
L	_____ mm ± 2%	Length of the heating element
X	_____ W/m	Power per meter (heated length)
V	_____ V	Supply voltage
Z	_____ m	Cable length in meters
Y	_____	Y=Yes if something special apply

TotalPower : \_\_\_\_\_ W ±5%  
 Cable dimension: 2 x 1,5 mm<sup>2</sup>  
 OD cable size: 9 mm  
 Label LBL: \_\_\_\_\_

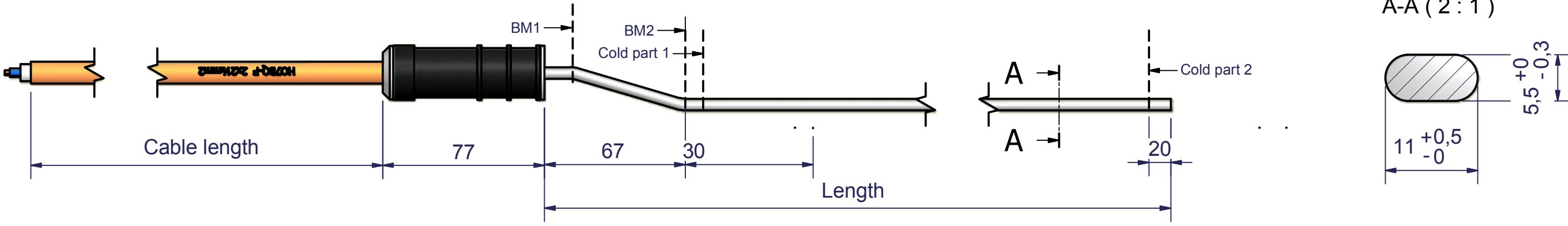
Barrel type: Water tight PE-LD ø25/21x65 Black  
 Cable type: PUR-cable HO7 BQ-F orange  
 Element profile: SAN SSV 11x5,5

## MANUFACTURING INFO ONLY

Type SSV _____ / <u>160</u> - <u>20</u> / _____		BM = Bending mark: 148 mm				
Tube	Total Length	Cold part 1	Cold part 2			
Heated Length						
Total length = Length + 109 mm						
Y: Special to add:						
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Tolerance	Machined ISO 2768m	Material	Mass			
	Welded ISO 13920 BF					
Alteration			Rev.	Date	Made by	
Drawn by	kj	Reviewed by	Approved by	Dwg. no.		
Date	13-08-2010	Date	Date			
Item			Railway System			
			 www.san-as.com		CHANGE REV.	
					0	

# Shape : S1 (Straight - Sunk)

MODEL : SSV - S1 - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_



Heating Element Specification


MODEL: SSV - S1 - L - XW - V - CZ - Y

SSV	_____	SSV	Type of heating element
S1	_____	S1	Shape of the heating element
L	_____	mm ± 2%	Length of the heating element
X	_____	W/m	Power per meter (heated length)
V	_____	V	Supply voltage
Z	_____	m	Cable length in meters
Y	_____		Y=Yes if something special apply

TotalPower :	_____	W ±5%
Cable dimension:	2 x 1,5	mm <sup>2</sup>
OD cable size:	9	mm
Label LBL:	_____	

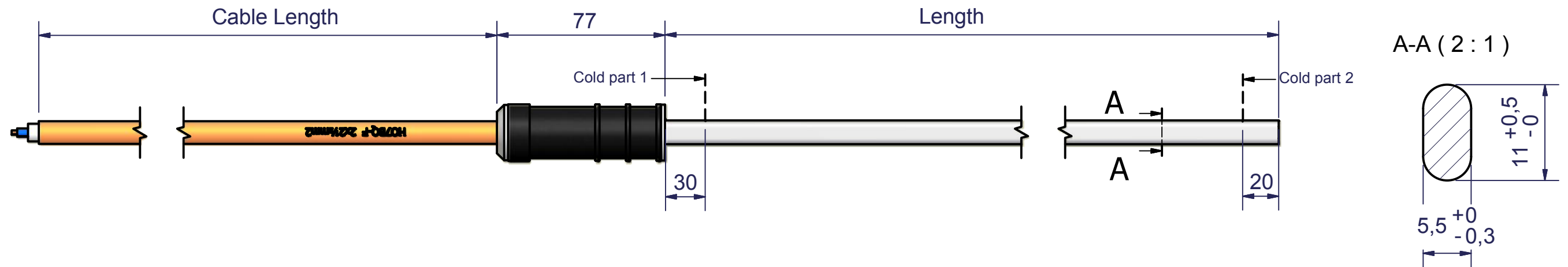
Barrel type: Water tight PE-LD ø25/21x65 Black  
 Cable type: PUR-cable HO7 BQ-F orange  
 Element profile: SAN SSV 11x5,5

**MANUFACTURING INFO ONLY**

Type SSV _____ / __ 90 __ - __ 20 __ / _____				BM = Bending mark: 1: 37 mm 2: 55 mm		
Tube	Total Length	Cold part 1	Cold part 2	Heated Length		
Total length = Length + 30 mm						
Y: Special to add:						
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Tolerance	Machined ISO 2768m	Material	Mass			
	Welded ISO 13920 BF					
Alteration				Rev.	Date	Made by
Drawn by	kj	Reviewed by		Approved by		Dwg. no.
Date	13-08-2010	Date		Date		
Item				Railway System		
				 Electro Heat www.san-as.com		CHANGE REV. 0

MODEL : SSV - S2 - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

# Shape : S2 (Straight)



### Heating Element Specification

MODEL: SSV - L2 - L - XW - V - CZ - Y

SSV	SSV	Type of heating element
S2	S2	Shape of the heating element
L	_____ mm ± 2%	Length of the heating element
X	_____ W/m	Power per meter (heated length)
V	_____ V	Supply voltage
Z	_____ m	Cable length in meters
Y	_____	Y=Yes if something special apply

TotalPower : \_\_\_\_\_ W ±5%  
 Cable dimension: 2 x 1,5 mm<sup>2</sup>  
 OD cable size: 9 mm  
 Label LBL: \_\_\_\_\_

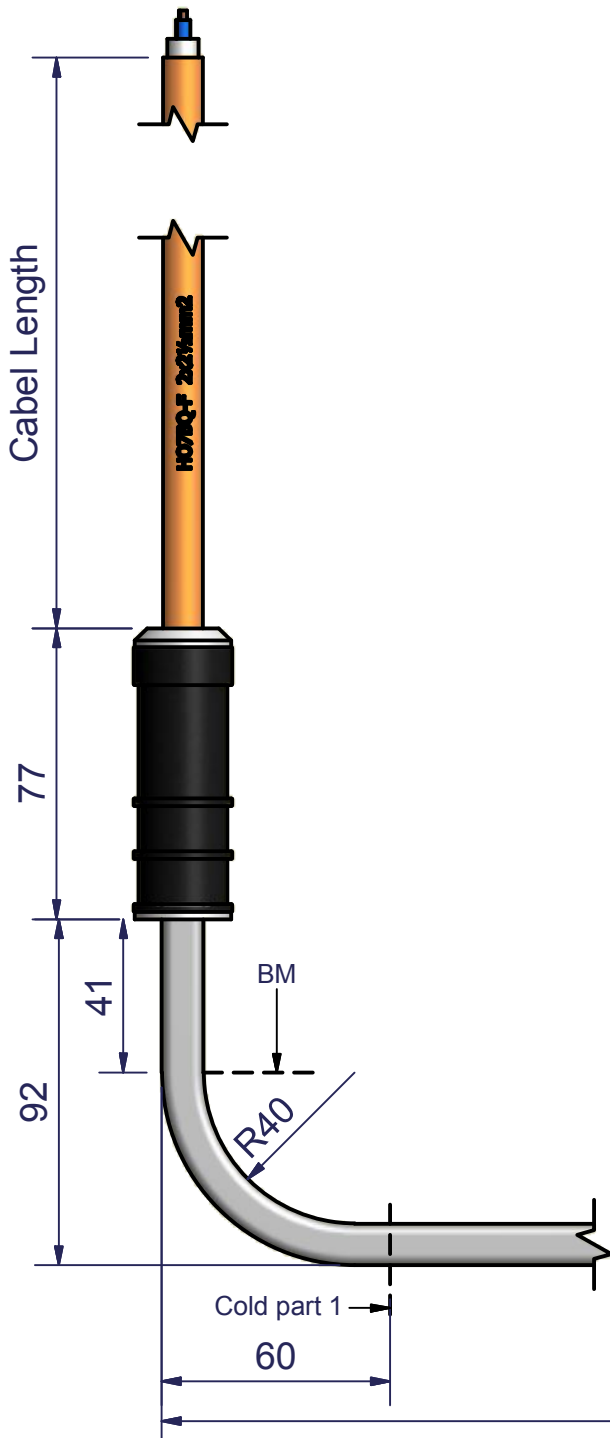
Barrel type: Water tight PE-LD ø25/21x65 Black  
 Cable type: PUR-cable HO7 BQ-F orange  
 Element profile: SAN SSV 11x5,5

### MANUFACTURING INFO ONLY

Type SSV _____ / <u>60</u> - <u>20</u> / _____		Length + 25 mm				
Tube	Total Length	Cold part 1	Cold part 2 Heated Length			
Y: Special to add: _____						
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Tolerance	Machined ISO 2768m	Material	Mass	_____	_____	_____
	Welded ISO 13920 BF			_____	_____	_____
Alteration			Rev.	Date	Made by	
Drawn by	kj	Reviewed by	Approved by	Dwg. no.		
Date	16-08-2010	Date	Date			
Item			Railway System		 www.san-as.com	
			CHANGE REV.	0		

# Shape : L1 (Connection 90°)

MODEL : SSV - L1 - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_



Heating Element Specification

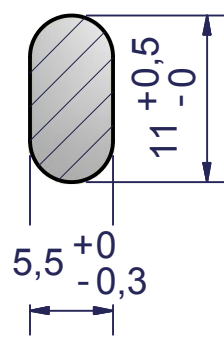
MODEL: SSV - L1 - L - XW - V - CZ - Y

SSV	_____	SSV	_____	Type of heating element
L1	_____	L1	_____	Shape of the heating element
L	_____	mm ± 2%	_____	Length of the heating element
X	_____	W/m	_____	Power per meter (heated length)
V	_____	V	_____	Supply voltage
Z	_____	m	_____	Cable length in meters
Y	_____		_____	Y=Yes if something special apply

TotalPower : \_\_\_\_\_ W ±5%  
 Cable dimension: \_\_\_\_\_ mm<sup>2</sup>  
 OD cable size: \_\_\_\_\_ mm  
 Label LBL: \_\_\_\_\_

Barrel type: Water tight PE-LD ø25/21x65 Black  
 Cable type: PUR-cable  
 Element profile: SAN SSV 11x5,5

A-A (2:1)



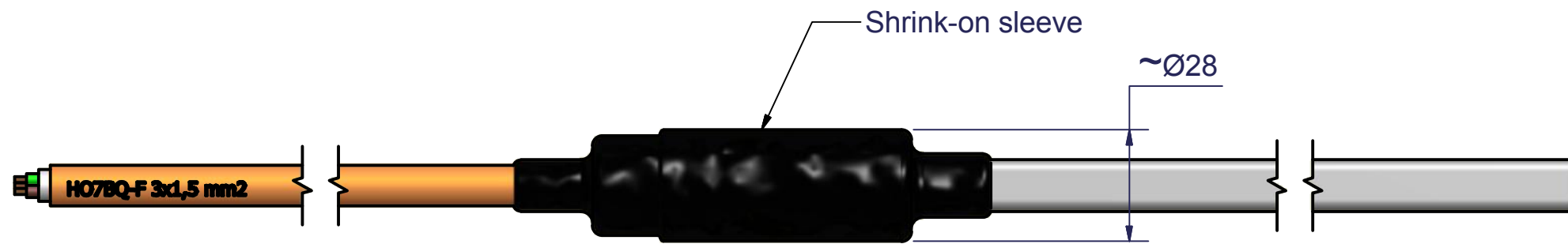
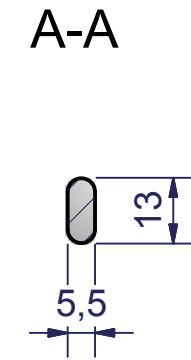
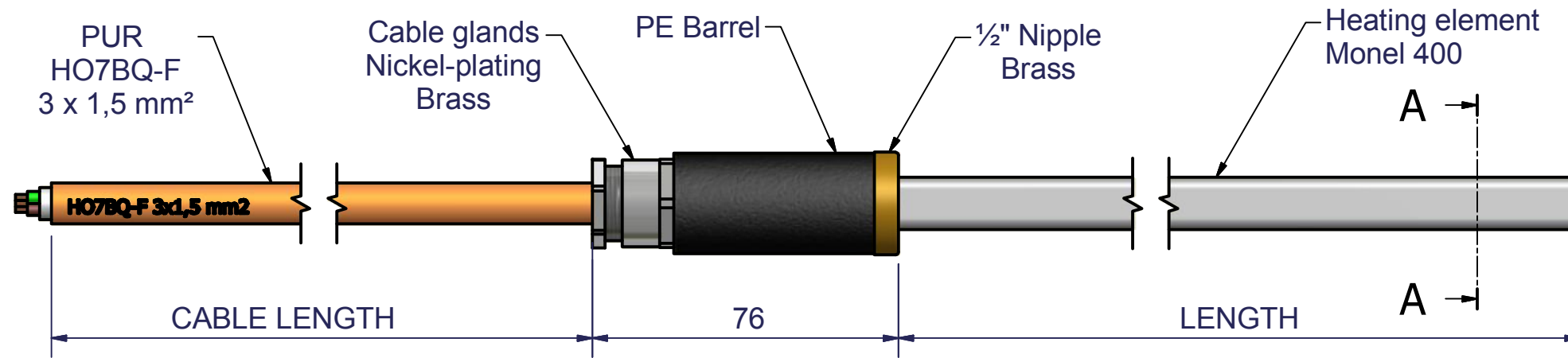
**MANUFACTURING INFO ONLY**

Type SSV _____ / _ 146 _ - _ 20 _ / _____ Tube Total Length Cold part 1 Cold part 2 Heated Length Total length = Length + 85 mm	BM = Bending mark: 65 mm Rulle 80 H 90°
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Y: Special to add:	Cable length _____ Length _____
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Tolerance	Machined ISO 2768m	Material	Mass			
	Welded ISO 13920 BF			Tillæg fra 70 til 85 mm		
Alteration				Rev.	Date	Made by
Drawn by	kj	Reviewed by		Approved by	Dwg. no.	
Date	07-06-2011	Date		Date		
Item				Railway System		 www.san-as.com
				CHANGE REV.	1	

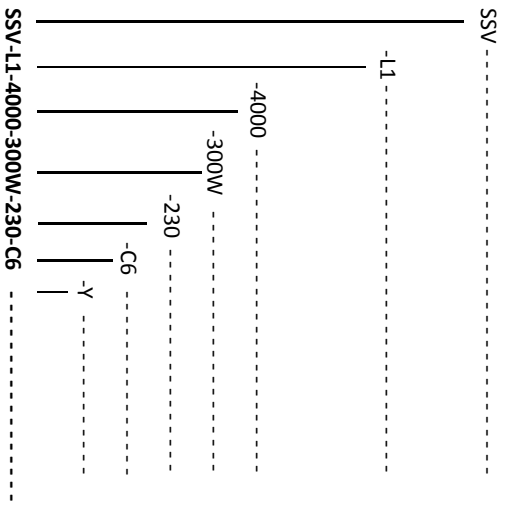


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CHANGE REV.: A,B,C... Internal Review 0A Issued for Review 0B, 0C... Re-issued for Rev. 01 Issued for Construction 02,03... Re-Issued for Construction

Tolerance	Machined	Material	Mass	Alteration			Rev.	Date	Made by
	ISO 2768 m								
	Welded								
	ISO 13920 BF								
Drawn by	KJ	Checked by	SN	Approved by	TA / SAN	Dwg. no.			
Date	12-09-2012	Date	12-09-2012	Date	12-09-2012	SL-TRAMLINE-SALES			
Item	Heating element for embedded switch points type SL					Project	CHANGE REV.	0A	
				www.san-as.com		1 / 1			

## MODEL SPECIFICATION - SWITCH POINT HEATING ELEMENTS



Type of heating element  
 SSV.....(5x11 mm Extra flexible and mechanical shock absorbent)  
 SV.....(5x13 mm High power) SL..... (Embedded switches)

Shape of the element  
 L1, L2, L3.... L shape as per drawing  
 U1, U2, U3... U shape as per drawing  
 S1, S2, S3.... straight element as per drawing

Length in mm  
 Power output in Watt per meter  
 Supply voltage  
 Cable length in meters  
 Y.... Yes, something special to add about this heating element

**SAMPLE MODEL: SSV type heating element, L shaped as per drawing L1, 4000mm length, power output of 300 Watt per meter, 230 V supply voltage, delivered with 6 meter of cable.**

## SPECIAL ORDER SPECIFICATIONS

In some cases it could be necessary to order heating elements that is just a little bit special from the standard. E.g. The L shape distance from the connection head to the angle has to be bigger, or we supply the connection head with a coloured ring for easy identification.

In these cases add the -Y in the end of the ordering number and add the extra specification in writing.

Many countries have there special requirements for dedicated switch points or for the hole territory. SAN is very flexible to help meeting these demands.

## COMPLETE SOLUTION

The key to minimize the energy consumption and still not jeopardize the railway traffic is to use an intelligent system to control the switch point heating elements.

The system BLUE POINT uses multiple information to control the heating process. Some information are measured directly other information's is coming from the server (supervision system / SCADA).

See more in the Product Specification: **PS-SBP-CONTROL**



**SAN Electro Heat A/S (Member of the NIBE group)**  
 Danish located, International company offering more than 50 Years of experience in developing and manufacturing of advanced, technical electric heating solutions and components. Products highly cost and energy optimized developed together with the customer. Our focus and know-how is divided into four business areas: Railway Systems, Wind Power, Industrial Process and Comfort Heating.



**SAN - Railway Systems (Part of NIBE Railway Components)**  
 Complete systems to secure optimal operation under any winter weather situations: Switch Point Heating, Overhead Wire de-icing and Third rail de-icing. Our focus is to deliver highly efficient systems that reduces energy consumption and reduces 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.