13.31.016
Hannover, 2013-04-30

ESE/Lepsy

GodeWind 2 / 2K - criterion

Reference: Communication Note 0002 from 2013-04-25

Re. 2K – criterion – dynamic load PCC 670 A / 510 A and ICC 335 A / 256 A

The following documents contain the calculations regarding the seabed heating due to the losses of the cables. The considered cross-sections are 630 mm² and 500 mm² for the PCC and 150 mm² for the ICC.

The soil thermal resistance has been specified with 0.5 K·m/W and 0.7 K·m/W. The surrounding soil temperature is 15 °C. According to the BSH-requirement the calculation point for the 2K-criterion is 0.2 m (offshore area). The considered laying depth of the cable is 1.0 m and 1.5 m. It is assumed that the final temperature (steady-state) is reached after 2 000 h at the specified continuous load. The temperature has been calculated for a high load of four and seven days.

The attached calculations are summarized in a table showing the temperature difference and the final temperature at the 2K-point.

2K - Criterion - dynamic load

Thermal resistance of soil in K · m / W	0.5			0.7		
Thermal diffusity of soil in m² / s	8.0E-07			6.0E-07		
Cross-section in mm²	630	500	150	630	500	150
after 4 days high load						
max. 2K-point temp. increase 1.0 m in K	1.82	2.08	1.21	2.40	2.74	1.59
max. 2K-point temp. increase 1.5 m in K	0.97	1.09	0.64	1.26	1.44	0.83
max. 2K-point temperature 1.0 m in °C	16.82	17.08	16.21	17.40	17.74	16.59
max. 2K-point temperature 1.5 m in °C	15.97	16.09	15.64	16.26	16.44	15.83
after 7 days high load						
max. 2K-point temp. increase 1.0 m in K	2.02	2.30	1.35	2.70	3.09	1.80
max. 2K-point temp. increase 1.5 m in K	1.10	1.24	0.73	1.41	1.61	0.94
max. 2K-point temperature 1.0 m in °C	17.02	17.30	16.35	17.70	18.09	16.80
max. 2K-point temperature 1.5 m in °C	16.10	16.24	15.73	16.41	16.61	15.94

Temperature of enviroment	15 °C
Depth of 2K-point (offshore)	0.2 m

Load Profile

PCC	High Load	670 A
	Mean Load	510 A
ICC	High Load	335 A
	Mean Load	256 A

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Energy Networks Germany

Conductor Temperature Calculation For Long Transients

acc. to IEC 60853-2 and IEC 60287

1 Introduction

This document shows the temperature graphs of the conductors and the 2K point during a current step. The 2K - criterion says that the permissible maximum temperature rise at the 2K - point is 2 K.

In this case the 2K - point ist 0.2 m under the sea floor directly above the cable.

The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

The calculation of the thermal resistivities of the cable and the soil as the cable losses is according IEC 60287 "Electric cables - Calculation of the current rating".

For the necessary cable data see the attached corresponding calculation printouts.

2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.5 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.8 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.0m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 800 \cdot mm$

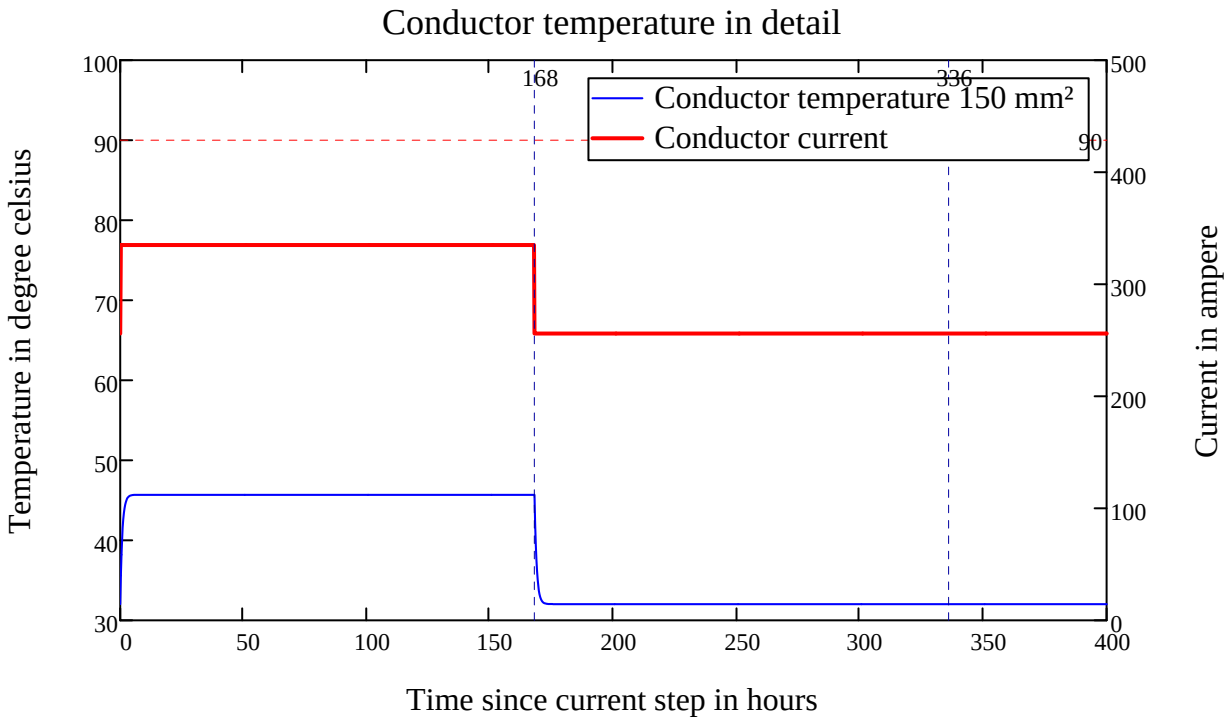
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1200 \cdot mm$

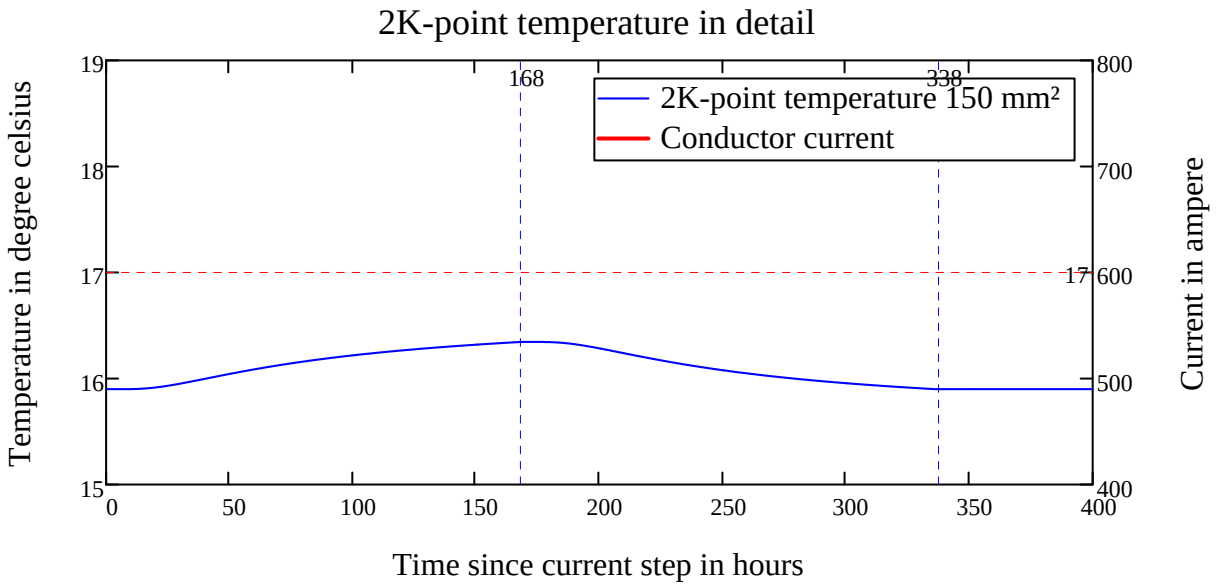
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(256 A)
	168 h	100% load	(335 A)
	Steady-State	75% load	(256 A)
Cable Types	ICC 3x150RM/16 20/34 kV		

3 Temperature Graphs





4 Temperature data

150 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 16.208\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 16.345\,K$ 2K-point temperature after 7 days

Conductor Temperature Calculation For Long Transients

acc. to IEC 60853-2 and IEC 60287

1 Introduction

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In this case the 2K - point ist 0.2 m under the sea floor directly above the cable.

The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

The calculation of the thermal resistivities of the cable and the soil as the cable losses is according IEC 60287 "Electric cables - Calculation of the current rating".

For the necessary cable data see the attached corresponding calculation printouts.

2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.7\frac{K\cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.6\cdot 10^{-6}\frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.0m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1\cdot x)^n}{n\cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 800\cdot mm$

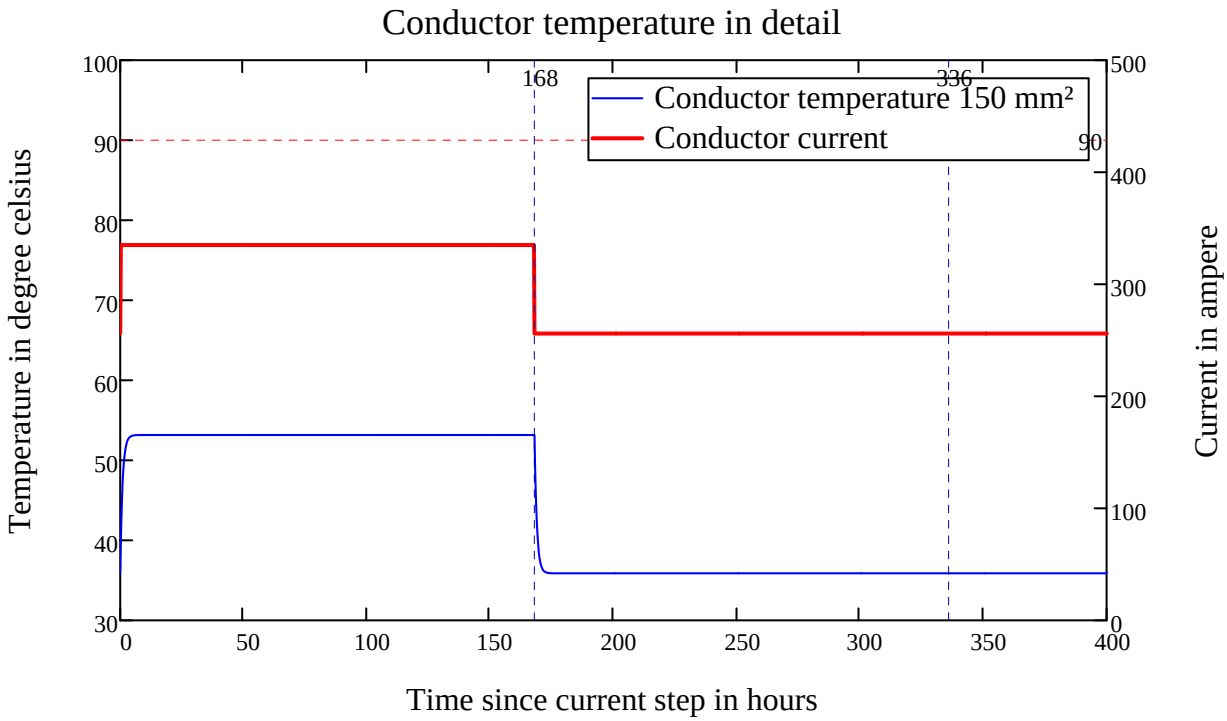
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1200\cdot mm$

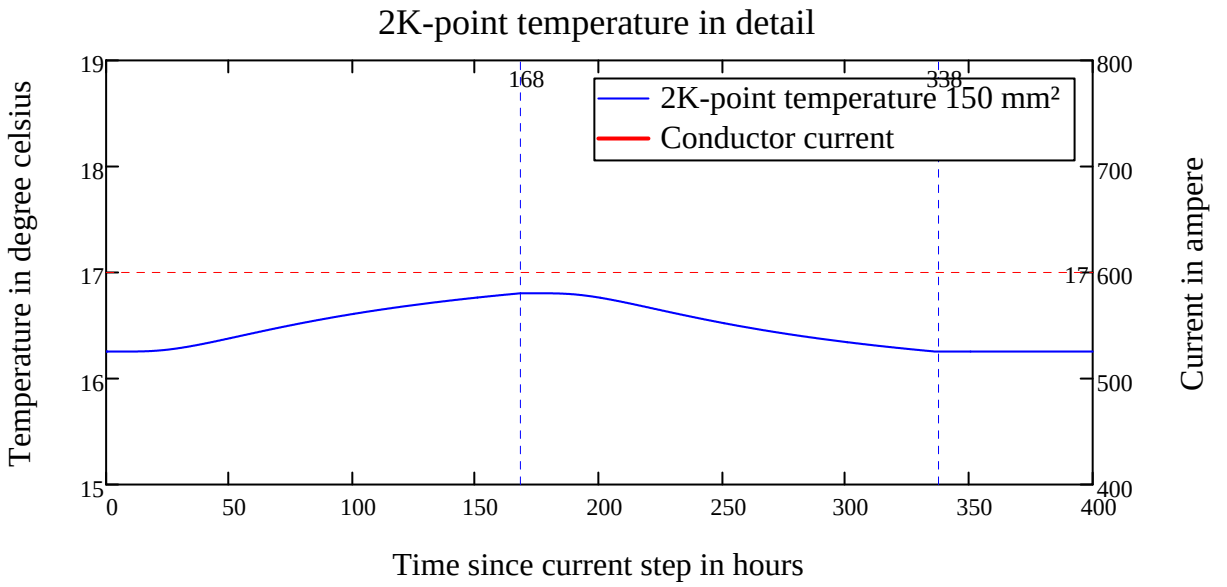
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil}\cdot P_V}{4\pi}\cdot\left(Ei\left(\frac{d_{pk}^2}{4\cdot t_h\cdot\delta_{soil}}\right) - Ei\left(\frac{d'^2_{pk}}{4\cdot t_h\cdot\delta_{soil}}\right)\right)$$

Load Profile:	Steady-State	75% load	(256 A)
	168 h	100% load	(335 A)
	Steady-State	75% load	(256 A)
Cable Types	ICC 3x150RM/16 20/34 kV		

3 Temperature Graphs





4 Temperature data

150 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 16.593\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 16.804\,K$ 2K-point temperature after 7 days

Conductor Temperature Calculation For Long Transients

acc. to IEC 60853-2 and IEC 60287

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The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

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2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.5 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.8 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.5m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 1300 \cdot mm$

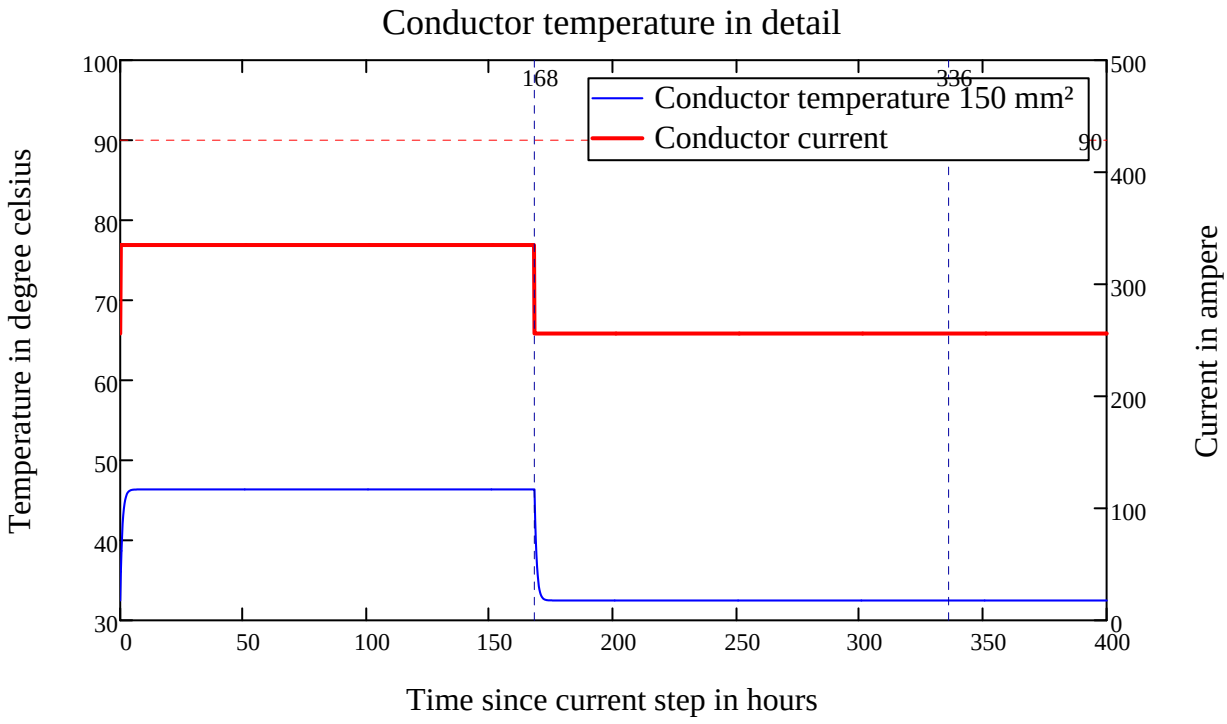
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1700 \cdot mm$

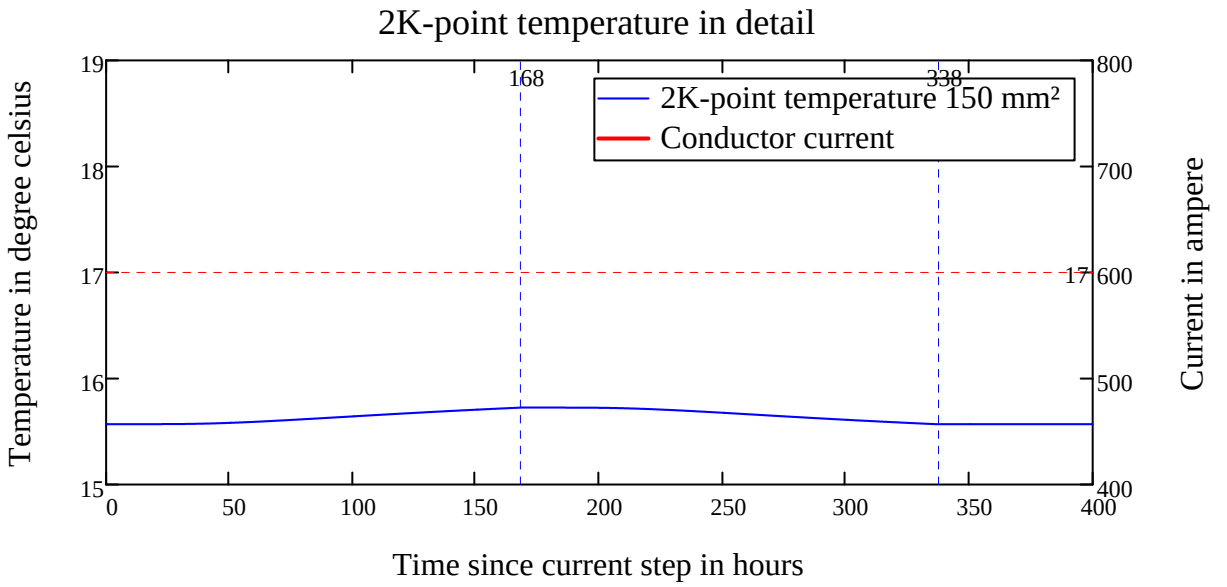
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(256 A)
	168 h	100% load	(335 A)
	Steady-State	75% load	(256 A)
Cable Types	ICC 3x150RM/16 20/34 kV		

3 Temperature Graphs





4 Temperature data

150 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 15.637\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 15.725\,K$ 2K-point temperature after 7 days

Conductor Temperature Calculation For Long Transients

acc. to IEC 60853-2 and IEC 60287

1 Introduction

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In this case the 2K - point ist 0.2 m under the sea floor directly above the cable.

The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

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For the necessary cable data see the attached corresponding calculation printouts.

2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.7 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.6 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.5m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 1300 \cdot mm$

Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1700 \cdot mm$

Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

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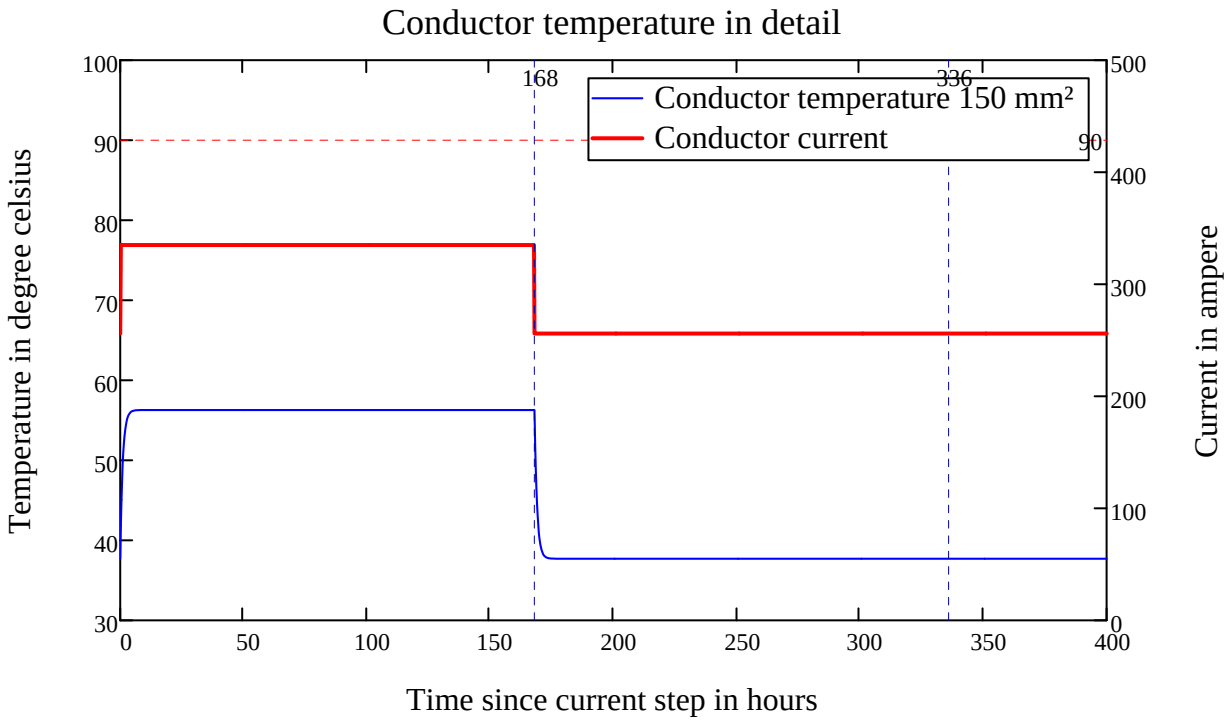
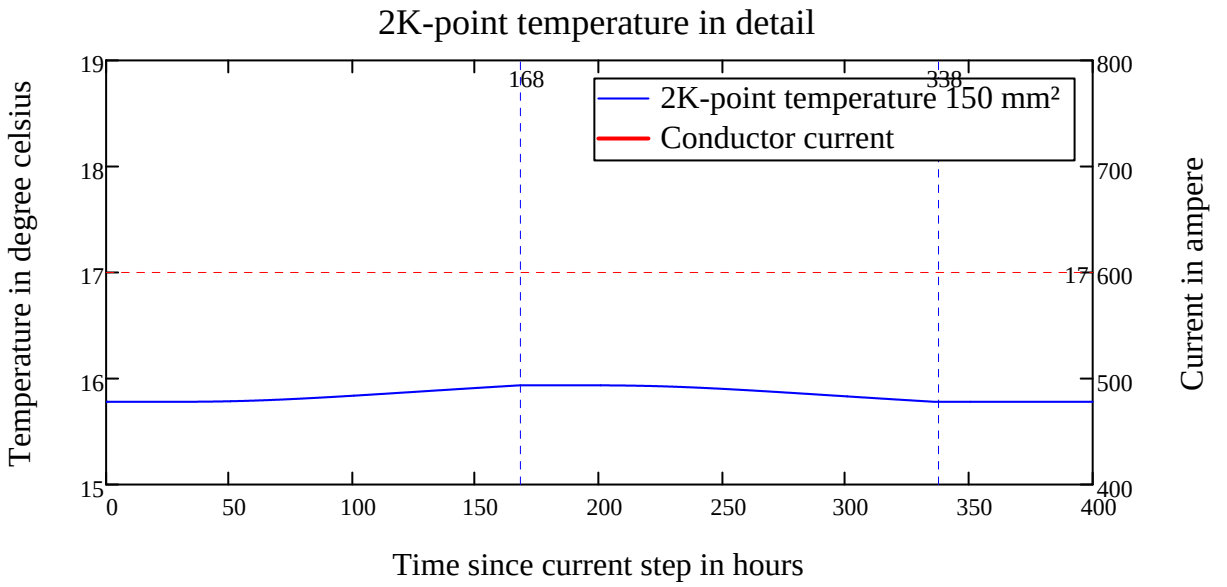
	168 h	100% load	(335 A)
	Steady-State	75% load	(256 A)
Cable Types	ICC 3x150RM/16 20/34 kV		

3 Temperature Graphs





4 Temperature data

150 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 15.832\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 15.936\,K$ 2K-point temperature after 7 days

Conductor Temperature Calculation For Long Transients

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In this case the 2K - point ist 0.2 m under the sea floor directly above the cable.

The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

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For the necessary cable data see the attached corresponding calculation printouts.

2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.5 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.8 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.0m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 800 \cdot mm$

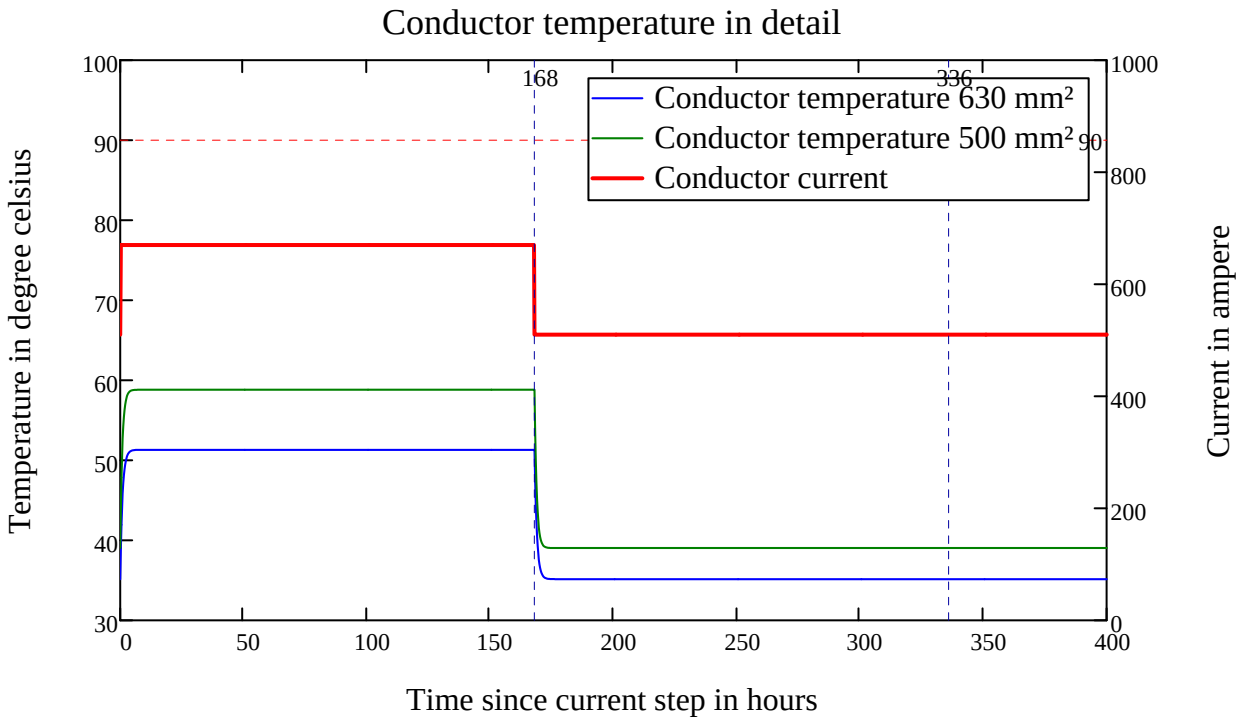
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1200 \cdot mm$

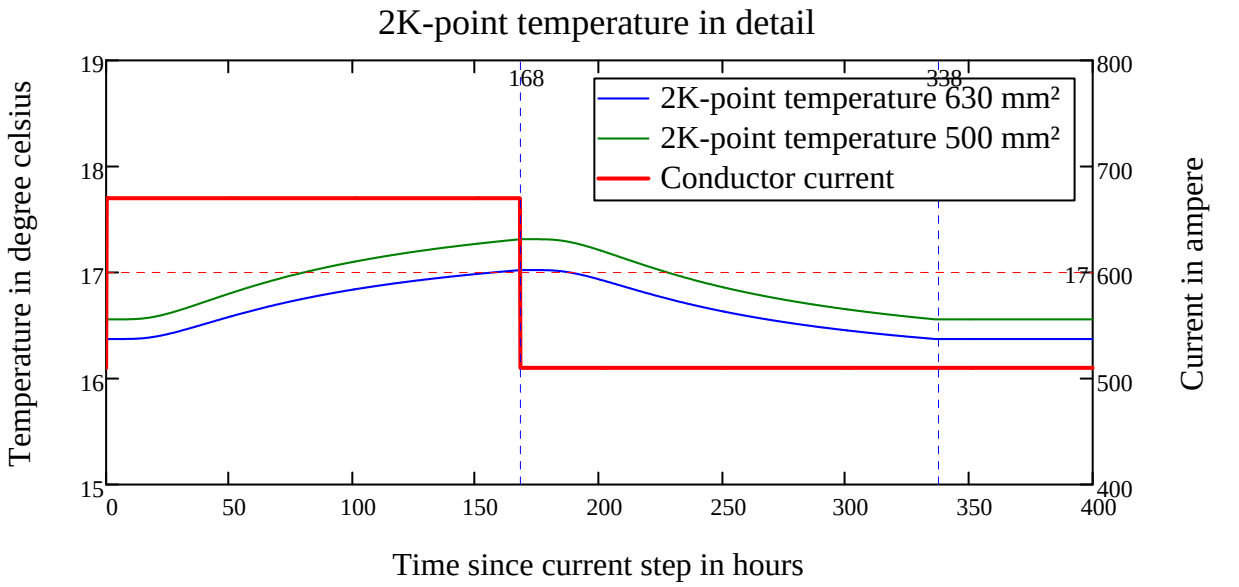
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(510 A)
	168 h	100% load	(670 A)
	Steady-State	75% load	(510 A)
Cable Types	PCC 3x630RM/25 20/34 kV		
	PCC 3x500RM/25 20/34 kV		

3 Temperature Graphs





4 Temperature data

630 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 16.822\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 17.023\,K$ 2K-point temperature after 7 days

500 mm²

$\theta_2(4 \times 24 \cdot h, 1) = 17.081\,K$ 2K-point temperature after 4 days

$\theta_2(7 \cdot 24 \cdot h, 1) = 17.313\,K$ 2K-point temperature after 7 days

Conductor Temperature Calculation For Long Transients

acc. to IEC 60853-2 and IEC 60287

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In this case the 2K - point ist 0.2 m under the sea floor directly above the cable.

The load on the cable is dynamic. The calculation of the thermal step response of the soil due to the current step is according to IEC 60853-2 "Cyclic rating of cables greater than 18/30 (36) kV and emergency ratings for cables of all voltages".

The calculation of the thermal resistivities of the cable and the soil as the cable losses is according IEC 60287 "Electric cables - Calculation of the current rating".

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2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.7 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.6 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.0m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 800 \cdot mm$

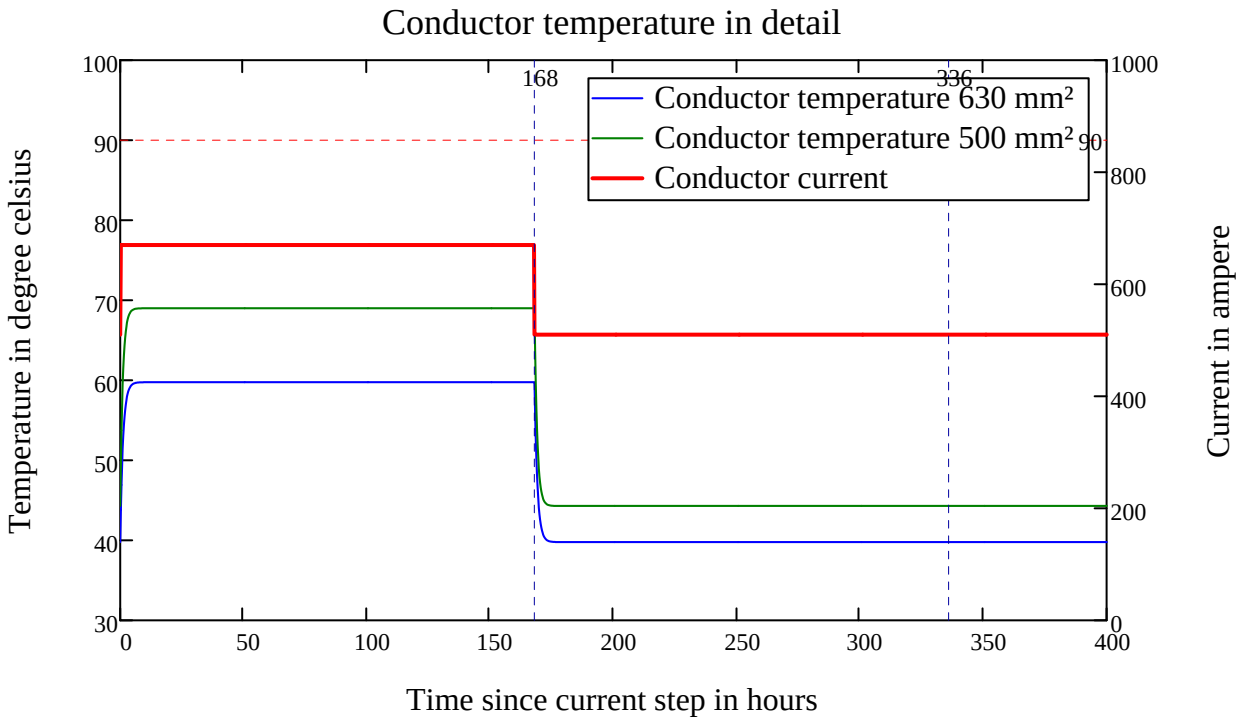
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1200 \cdot mm$

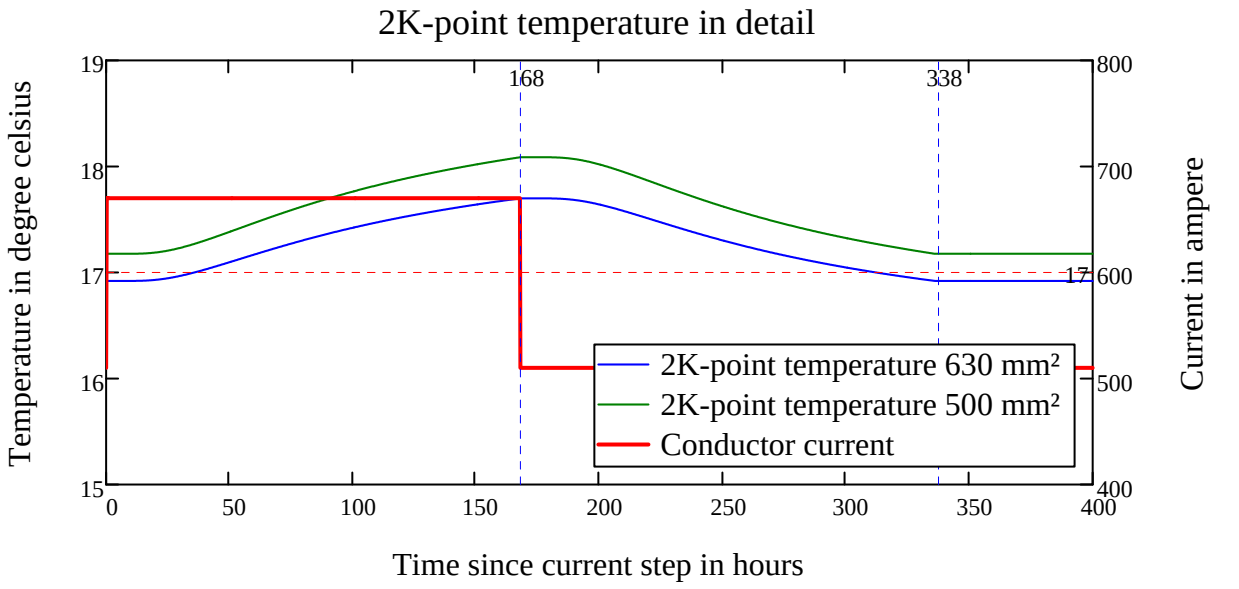
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(510 A)
	168 h	100% load	(670 A)
	Steady-State	75% load	(510 A)
Cable Types	PCC 3x630RM/25 20/34 kV		
	PCC 3x500RM/25 20/34 kV		

3 Temperature Graphs





4 Temperature data

630 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 17.4\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 17.699\,K$ 2K-point temperature after 7 days

500 mm²

$\theta_2(4 \times 24 \cdot h, 1) = 17.737\,K$ 2K-point temperature after 4 days

$\theta_2(7 \cdot 24 \cdot h, 1) = 18.087\,K$ 2K-point temperature after 7 days

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2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.5 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.8 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.5m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 1300 \cdot mm$

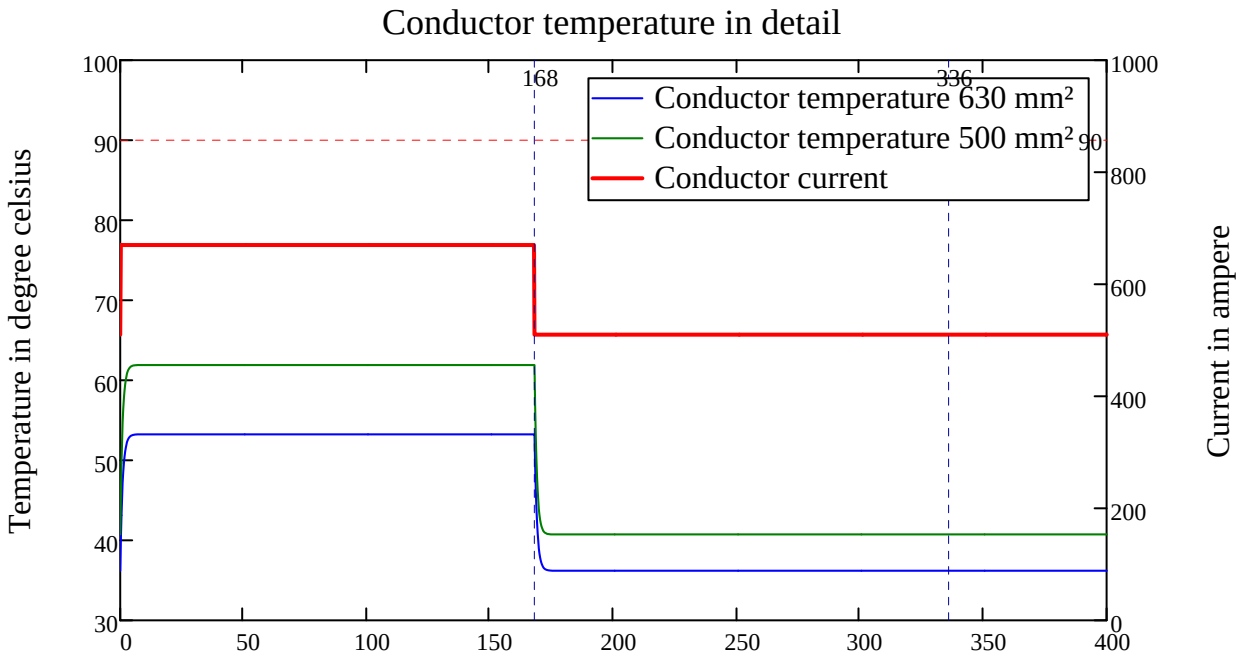
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1700 \cdot mm$

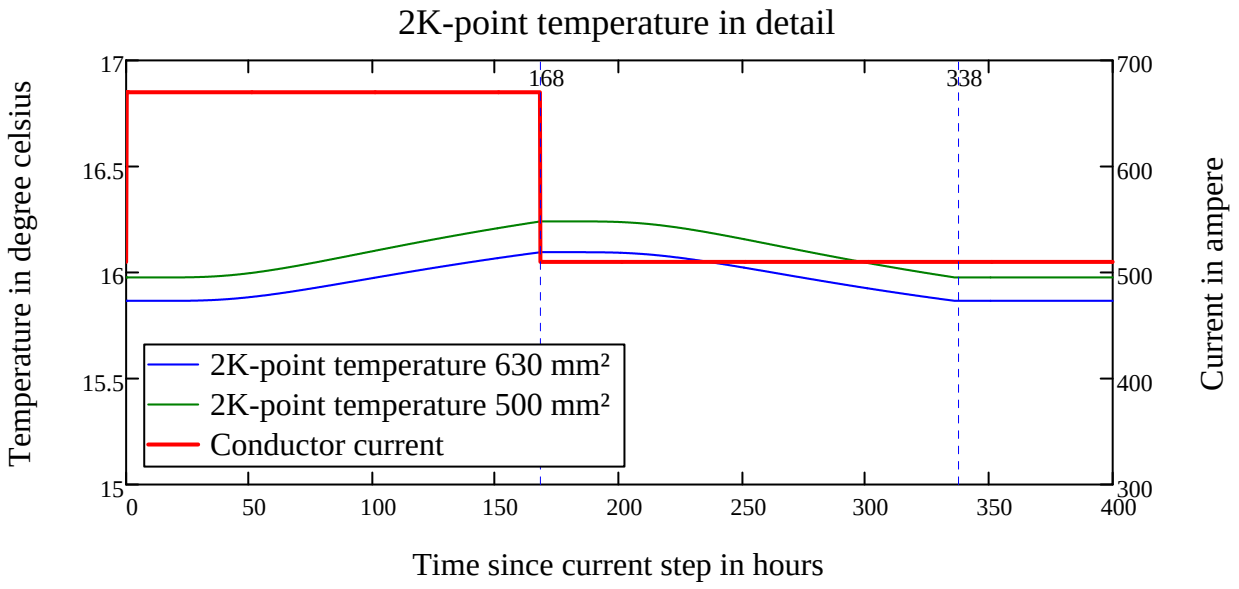
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(510 A)
	168 h	100% load	(670 A)
	Steady-State	75% load	(510 A)
Cable Types	(F)2XS(FL)2Y>c< 1x3x630RM/25 20/34 kV		
	(F)2XS(FL)2Y>c< 1x3x500RM/25 20/34 kV		

3 Temperature Graphs





4 Temperature data

630 mm²

$\theta_2(4 \times 24 \cdot h, 0) = 15.966\,K$ 2K-point temperature after 4 days

$\theta_2(7 \times 24 \cdot h, 0) = 16.095\,K$ 2K-point temperature after 7 days

500 mm²

$\theta_2(4 \times 24 \cdot h, 1) = 16.091\,K$ 2K-point temperature after 4 days

$\theta_2(7 \cdot 24 \cdot h, 1) = 16.241\,K$ 2K-point temperature after 7 days

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For the necessary cable data see the attached corresponding calculation printouts.

2 Thermal Hypothesis

Thermal resistance of the surrounding soil $\rho_{soil} := 0.7 \frac{K \cdot m}{W}$

Thermal diffusity of the surrounding soil $\delta_{soil} := 0.6 \cdot 10^{-6} \frac{m^2}{s}$

Temperature of the surrounding soil $\theta_{soil} := 15K$

Laying depth of the cable $ld := 1.5m$

Depth of 2K - point $Point2K := 0.2m$

Exponential Integral

$$Ei(x) := \begin{cases} -\gamma - \ln(x) - \sum_{n=1}^{100} \frac{(-1 \cdot x)^n}{n \cdot n!} & \text{if } 0 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

Distance laying depth to 2K - point $d_{pk} := ld - Point2K = 1300 \cdot mm$

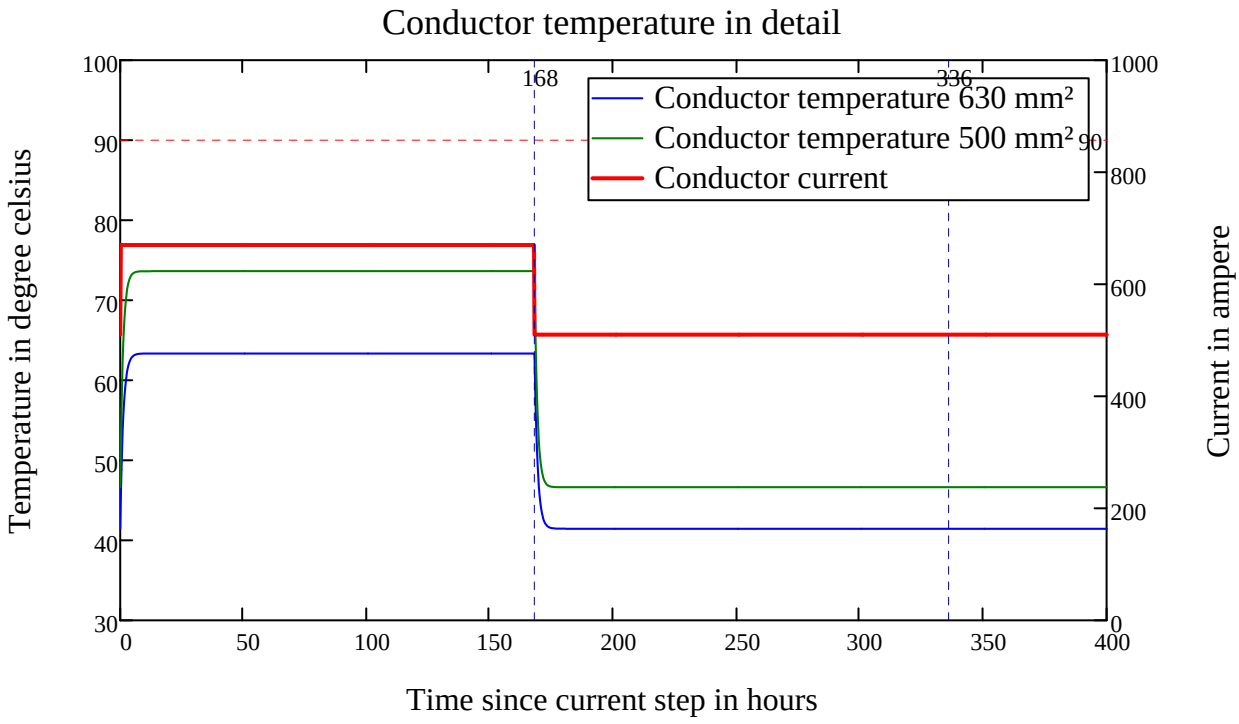
Distance mirror cable to 2K - point $d'_{pk} := ld + Point2K = 1700 \cdot mm$

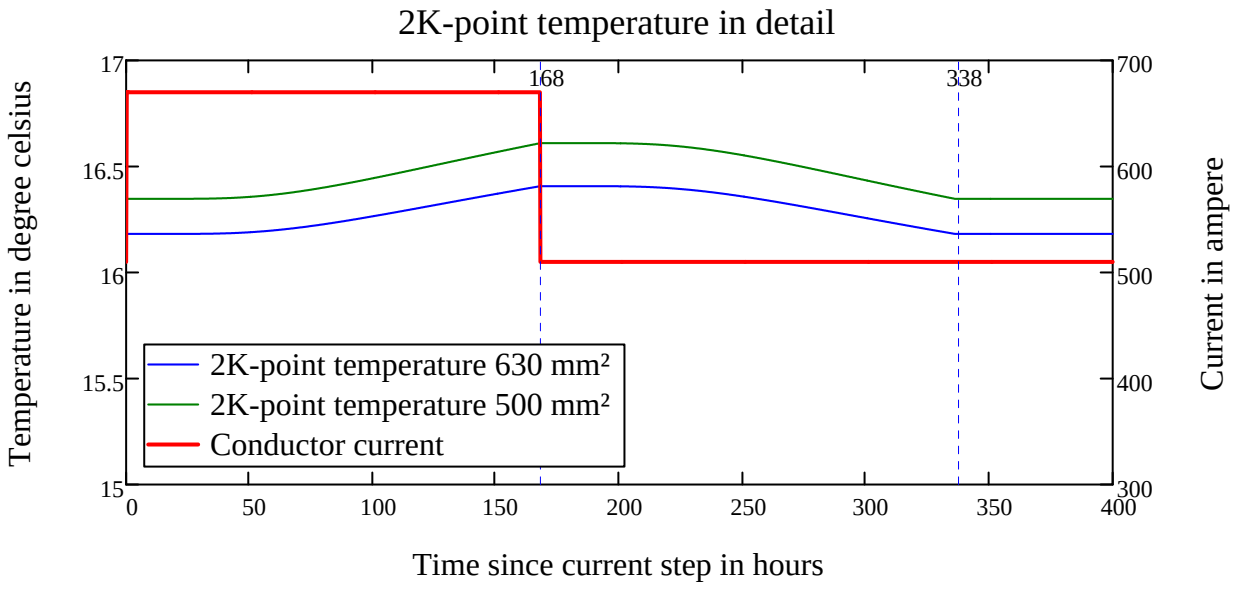
Thermal response of the soil

$$\Delta\theta_{env}(t_h, P_V) := \frac{\rho_{soil} \cdot P_V}{4\pi} \cdot \left(Ei\left(\frac{d_{pk}^2}{4 \cdot t_h \cdot \delta_{soil}} \right) - Ei\left(\frac{d'^2_{pk}}{4 \cdot t_h \cdot \delta_{soil}} \right) \right)$$

Load Profile:	Steady-State	75% load	(510 A)
	168 h	100% load	(670 A)
	Steady-State	75% load	(510 A)
Cable Types	PCC 3x630RM/25 20/34 kV		
	PCC 3x500RM/25 20/34 kV		

3 Temperature Graphs





4 Temperature data

630 mm²

$\theta_2(4 \times 24{\cdot}\mathrm{h}, 0) = 16.257\,\mathrm{K}$ 2K-point temperature after 4 days

$\theta_2(7 \times 24{\cdot}\mathrm{h}, 0) = 16.407\,\mathrm{K}$ 2K-point temperature after 7 days

500 mm²

$\theta_2(4 \times 24{\cdot}\mathrm{h}, 1) = 16.435\,\mathrm{K}$ 2K-point temperature after 4 days

$\theta_2(7 \times 24{\cdot}\mathrm{h}, 1) = 16.61\,\mathrm{K}$ 2K-point temperature after 7 days

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	32.9 °C

Current-carrying cap.: 256.6 A <=> 15.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	32.9	150	0.1303	257
2	17.0	0.0886		32.1			
3	32.2	0.3558		29.1			
4	33.5	0.0220		28.5			
5	34.1	0.0170		28.0			
6	36.1		0.0277	28.0	16	1.1116	15
8	36.5		0.0239	28.0	23	1.2855	13
9	92.7	0.1209		24.7	653		
10	100.7		0.0690	24.7	729	0.1934	55
13	107.9	0.0659		22.8			

2. C O N D U C T O R
Ro=0.1240 Ohm/km R'=0.1303 Ohm/km ys=0.0048 yp=0.0026 ks=1.00
kp=1.00 Rb=0.1313 Ohm/km Rz=0.0158 Ohm/km Rw=0.1471 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.287 K*m/W

4. L O S S E S O F S Y S T E M
Vc=25.8 kW/km Va=3.0 kW/km Vi=28.8 kW/km Vu=0.3 kW/km
Vtot=29.1 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=26.2 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//33)°C:(0.124 + j0.124 // 0.147 + j0.124) Ohm/km
Theoret. zero imp.(20//28)°C:(0.267 + j0.178 // 0.270 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	46.8 °C

Current-carrying cap.: 335.1 A <=> 19.7 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	46.8	150	0.1371	335
2	17.0	0.0886		45.4			
3	32.2	0.3558		39.9			
4	33.5	0.0220		38.9			
5	34.1	0.0170		38.1			
6	36.1		0.0254	38.1	16	1.1541	18
8	36.5		0.0219	38.1	23	1.3358	16
9	92.7	0.1209		32.1	653		
10	100.7		0.0646	32.1	729	0.1997	71
13	107.9	0.0659		28.7			

2. C O N D U C T O R
Ro=0.1240 Ohm/km R'=0.1371 Ohm/km ys=0.0044 yp=0.0024 ks=1.00
kp=1.00 Rb=0.1380 Ohm/km Rz=0.0154 Ohm/km Rw=0.1534 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.287 K*m/W

4. L O S S E S O F S Y S T E M
Vc=46.5 kW/km Va=5.1 kW/km Vi=51.6 kW/km Vu=0.3 kW/km
Vtot=51.9 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=25.0 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//47)°C:(0.124 + j0.124 // 0.153 + j0.124) Ohm/km
Theoret. zero imp.(20//38)°C:(0.267 + j0.178 // 0.275 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	33.9 °C

Current-carrying cap.: 256.5 A <=> 15.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	33.9	150	0.1308	257
2	17.0	0.0886		33.1			
3	32.2	0.3558		30.0			
4	33.5	0.0220		29.4			
5	34.1	0.0170		29.0			
6	36.1		0.0275	29.0	16	1.1156	15
8	36.5		0.0238	29.0	23	1.2903	13
9	92.7	0.1209		25.6	653		
10	100.7		0.0686	25.6	729	0.1941	55
13	107.9	0.0659		23.7			

2. C O N D U C T O R

Ro=0.1240 Ohm/km R'=0.1308 Ohm/km ys=0.0048 yp=0.0026 ks=1.00
kp=1.00 Rb=0.1317 Ohm/km Rz=0.0158 Ohm/km Rw=0.1475 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.320 K*m/W

4. L O S S E S O F S Y S T E M

Vc=26.1 kW/km Va=3.0 kW/km Vi=29.1 kW/km Vu=0.3 kW/km
Vtot=29.4 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=26.1 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//34)°C:(0.124 + j0.124 // 0.148 + j0.124) Ohm/km
Theoret. zero imp.(20//29)°C:(0.267 + j0.178 // 0.271 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	48.7 °C

Current-carrying cap.: 335.2 A <=> 19.7 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	48.7	150	0.1380	335
2	17.0	0.0886		47.3			
3	32.2	0.3558		41.7			
4	33.5	0.0220		40.7			
5	34.1	0.0170		39.9			
6	36.1		0.0250	39.9	16	1.1619	18
8	36.5		0.0216	39.9	23	1.3451	16
9	92.7	0.1209		34.0	653		
10	100.7		0.0639	34.0	729	0.2012	70
13	107.9	0.0659		30.5			

2. C O N D U C T O R

Ro=0.1240 Ohm/km R'=0.1380 Ohm/km ys=0.0043 yp=0.0023 ks=1.00
kp=1.00 Rb=0.1389 Ohm/km Rz=0.0154 Ohm/km Rw=0.1543 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.320 K*m/W

4. L O S S E S O F S Y S T E M

Vc=46.8 kW/km Va=5.1 kW/km Vi=51.9 kW/km Vu=0.3 kW/km
Vtot=52.2 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=24.9 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//49)°C:(0.124 + j0.124 // 0.154 + j0.124) Ohm/km
Theoret. zero imp.(20//40)°C:(0.267 + j0.178 // 0.276 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	39.7 °C

Current-carrying cap.: 510.7 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	39.7	500	0.0394	511
2	29.1	0.0500		39.1			
3	44.3	0.2341		36.5			
4	45.6	0.0161		35.9			
5	46.2	0.0125		35.5			
6	48.2		0.1214	35.5	25	0.7316	43
8	48.6		0.0895	35.5	30	0.9921	32
9	121.6	0.1132		30.8	1045		
10	130.6		0.2620	30.8	1066	0.1358	148
13	138.8	0.0582		27.8			

2. C O N D U C T O R

Ro=0.0366 Ohm/km R'=0.0394 Ohm/km ys=0.0507 yp=0.0466 ks=1.00
kp=1.00 Rb=0.0433 Ohm/km Rz=0.0205 Ohm/km Rw=0.0637 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.267 K*m/W

4. L O S S E S O F S Y S T E M

Vc=33.9 kW/km Va=15.9 kW/km Vi=49.8 kW/km Vu=0.6 kW/km
Vtot=50.4 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=85.4 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//40)°C:(0.037 + j0.104 // 0.064 + j0.104) Ohm/km
Theoret. zero imp.(20//35)°C:(0.134 + j0.133 // 0.139 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	58.9 °C

Current-carrying cap.: 670.6 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	58.9	500	0.0422	671
2	29.1	0.0500		57.9			
3	44.3	0.2341		53.0			
4	45.6	0.0161		52.0			
5	46.2	0.0125		51.2			
6	48.2		0.1084	51.2	25	0.7743	54
8	48.6		0.0798	51.2	30	1.0515	40
9	121.6	0.1132		42.9	1045		
10	130.6		0.2450	42.9	1066	0.1428	188
13	138.8	0.0582		37.7			

2. C O N D U C T O R
Ro=0.0366 Ohm/km R'=0.0422 Ohm/km ys=0.0445 yp=0.0417 ks=1.00
kp=1.00 Rb=0.0458 Ohm/km Rz=0.0199 Ohm/km Rw=0.0657 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.267 K*m/W

4. L O S S E S O F S Y S T E M
Vc=61.8 kW/km Va=26.7 kW/km Vi=88.5 kW/km Vu=0.6 kW/km
Vtot=89.1 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=80.1 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//59)°C:(0.037 + j0.104 // 0.066 + j0.104) Ohm/km
Theoret. zero imp.(20//51)°C:(0.134 + j0.133 // 0.145 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	41.4 °C

Current-carrying cap.: 510.7 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	41.4	500	0.0397	511
2	29.1	0.0500		40.8			
3	44.3	0.2341		38.2			
4	45.6	0.0161		37.6			
5	46.2	0.0125		37.2			
6	48.2		0.1200	37.2	25	0.7362	43
8	48.6		0.0885	37.2	30	0.9985	32
9	121.6	0.1132		32.5	1045		
10	130.6		0.2603	32.5	1066	0.1368	147
13	138.8	0.0582		29.5			

2. C O N D U C T O R
Ro=0.0366 Ohm/km R'=0.0397 Ohm/km ys=0.0501 yp=0.0461 ks=1.00
kp=1.00 Rb=0.0435 Ohm/km Rz=0.0204 Ohm/km Rw=0.0639 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.300 K*m/W

4. L O S S E S O F S Y S T E M
Vc=33.9 kW/km Va=15.9 kW/km Vi=49.8 kW/km Vu=0.6 kW/km
Vtot=50.4 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=84.9 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//41)°C:(0.037 + j0.104 // 0.064 + j0.104) Ohm/km
Theoret. zero imp.(20//37)°C:(0.134 + j0.133 // 0.140 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	62 °C

Current-carrying cap.: 670.3 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	62.0	500	0.0426	670
2	29.1	0.0500		61.0			
3	44.3	0.2341		56.1			
4	45.6	0.0161		55.1			
5	46.2	0.0125		54.3			
6	48.2		0.1063	54.3	25	0.7825	53
8	48.6		0.0783	54.3	30	1.0628	39
9	121.6	0.1132		45.8	1045		
10	130.6		0.2421	45.8	1066	0.1446	187
13	138.8	0.0582		40.6			

2. C O N D U C T O R

Ro=0.0366 Ohm/km R'=0.0426 Ohm/km ys=0.0437 yp=0.0410 ks=1.00
kp=1.00 Rb=0.0462 Ohm/km Rz=0.0197 Ohm/km Rw=0.0660 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.300 K*m/W

4. L O S S E S O F S Y S T E M

Vc=62.4 kW/km Va=26.7 kW/km Vi=89.1 kW/km Vu=0.6 kW/km
Vtot=89.7 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=79.3 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//62)°C:(0.037 + j0.104 // 0.066 + j0.104) Ohm/km
Theoret. zero imp.(20//54)°C:(0.134 + j0.133 // 0.146 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Belastbarkeit nach IEC 60287
Anfrage: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Drehstromsystem)

Erdlegung, Legetiefe Systemmitte	1000 mm
Spezif. Wärmewiderstand ausgetrockneter Boden	0,5 K*m/W
Spezif. Wärmewiderstand unbeeinflusster Boden	0,5 K*m/W
Belastungsgrad	1
Umgebungstemperatur	15 °C
Dauerbetriebstemperatur Leiter	35,5 °C

Belastbarkeit: 510,4 A <=> 30,1 MVA Frequenz 50 Hz

1. K A B E L

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30,6		1,0000	35,5	630	0,0300	510
2	33,1	0,0437		35,1			
3	48,3	0,2105		33,2			
4	49,6	0,0148		32,8			
5	50,2	0,0115		32,4			
6	52,2		0,1470	32,4	25	0,7233	43
8	52,6		0,1174	32,4	33	0,9058	34
9	129,8	0,1071		28,7	1117		
10	139,3		0,3427	28,7	1230	0,1165	164
13	147,5	0,0546		26,2			

2. L E I T E R
Ro=0,0283 Ohm/km R'=0,0300 Ohm/km ys=0,0850 yp=0,0819 ks=1,00
kp=1,00 Rb=0,0350 Ohm/km Rz=0,0213 Ohm/km Rw=0,0563 Ohm/km

3. Ä U S S E R E R T H E R M. W I D E R S T A N D
R(th) =0,263 K*m/W

4. S Y S T E M V E R L U S T E
Vl=27,3 kW/km Vz=16,5 kW/km Vi=43,8 kW/km Vu=0,6 kW/km
Vges=44,4 kW/km

5. K E N N W E R T E
C=0,3675 uF/km L=0,3151 mH/km X=0,0990 Ohm/km Il=2,27 A/km
Ie=6,8 A/km Pl=133,5 kVA/km Ik=109,0 kA/Wurzel(sec)
eps=2,5 tan d=0,004 Emax=3,13 kV/mm
Mitimpedanz (20//36)°C:(0,028 + j0,099 // 0,056 + j0,099) Ohm/km
Theoret. Nullimp. (20//32)°C:(0,115 + j0,122 // 0,119 + j0,122) Ohm/km

Bearbeiter: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	51 °C

Current-carrying cap.: 670.4 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	51.0	630	0.0317	670
2	33.1	0.0437		50.3			
3	48.3	0.2105		46.8			
4	49.6	0.0148		46.1			
5	50.2	0.0115		45.5			
6	52.2		0.1344	45.5	25	0.7588	54
8	52.6		0.1072	45.5	33	0.9512	43
9	129.8	0.1071		38.9	1117		
10	139.3		0.3277	38.9	1230	0.1217	210
13	147.5	0.0546		34.6			

2. C O N D U C T O R
Ro=0.0283 Ohm/km R'=0.0317 Ohm/km ys=0.0766 yp=0.0755 ks=1.00
kp=1.00 Rb=0.0366 Ohm/km Rz=0.0208 Ohm/km Rw=0.0574 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.263 K*m/W

4. L O S S E S O F S Y S T E M
Vc=49.2 kW/km Va=27.9 kW/km Vi=77.1 kW/km Vu=0.6 kW/km
Vtot=77.7 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=103.7 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//51)°C:(0.028 + j0.099 // 0.057 + j0.099) Ohm/km
Theoret. zero imp.(20//46)°C:(0.115 + j0.122 // 0.123 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	37 °C

Current-carrying cap.: 510.5 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	37.0	630	0.0302	511
2	33.1	0.0437		36.6			
3	48.3	0.2105		34.6			
4	49.6	0.0148		34.2			
5	50.2	0.0115		33.9			
6	52.2		0.1456	33.9	25	0.7273	43
8	52.6		0.1162	33.9	33	0.9109	34
9	129.8	0.1071		30.1	1117		
10	139.3		0.3412	30.1	1230	0.1172	164
13	147.5	0.0546		27.7			

2. C O N D U C T O R
Ro=0.0283 Ohm/km R'=0.0302 Ohm/km ys=0.0842 yp=0.0812 ks=1.00
kp=1.00 Rb=0.0352 Ohm/km Rz=0.0212 Ohm/km Rw=0.0564 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.295 K*m/W

4. L O S S E S O F S Y S T E M
Vc=27.6 kW/km Va=16.5 kW/km Vi=44.1 kW/km Vu=0.6 kW/km
Vtot=44.7 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=108.5 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//37)°C:(0.028 + j0.099 // 0.056 + j0.099) Ohm/km
Theoret. zero imp.(20//34)°C:(0.115 + j0.122 // 0.119 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.5 K*m/W
Soil thermal resistivity of moist zone	0.5 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	53.7 °C

Current-carrying cap.: 670.7 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	53.7	630	0.0320	671
2	33.1	0.0437		53.0			
3	48.3	0.2105		49.5			
4	49.6	0.0148		48.7			
5	50.2	0.0115		48.1			
6	52.2		0.1322	48.1	25	0.7659	54
8	52.6		0.1054	48.1	33	0.9604	43
9	129.8	0.1071		41.5	1117		
10	139.3		0.3251	41.5	1230	0.1230	209
13	147.5	0.0546		37.2			

2. C O N D U C T O R

Ro=0.0283 Ohm/km R'=0.0320 Ohm/km ys=0.0753 yp=0.0745 ks=1.00
kp=1.00 Rb=0.0368 Ohm/km Rz=0.0207 Ohm/km Rw=0.0576 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.295 K*m/W

4. L O S S E S O F S Y S T E M

Vc=49.8 kW/km Va=27.9 kW/km Vi=77.7 kW/km Vu=0.6 kW/km
Vtot=78.3 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=102.8 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//54)°C:(0.028 + j0.099 // 0.058 + j0.099) Ohm/km
Theoret. zero imp.(20//48)°C:(0.115 + j0.122 // 0.124 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	36.5 °C

Current-carrying cap.: 256.5 A <=> 15.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	36.5	150	0.1320	257
2	17.0	0.0886		35.7			
3	32.2	0.3558		32.6			
4	33.5	0.0220		32.0			
5	34.1	0.0170		31.6			
6	36.1		0.0270	31.6	16	1.1266	14
8	36.5		0.0233	31.6	23	1.3033	12
9	92.7	0.1209		28.2	653		
10	100.7		0.0676	28.2	729	0.1964	55
13	107.9	0.0659		26.3			

2. C O N D U C T O R
Ro=0.1240 Ohm/km R'=0.1320 Ohm/km ys=0.0047 yp=0.0026 ks=1.00
kp=1.00 Rb=0.1330 Ohm/km Rz=0.0157 Ohm/km Rw=0.1487 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.402 K*m/W

4. L O S S E S O F S Y S T E M
Vc=26.1 kW/km Va=3.0 kW/km Vi=29.1 kW/km Vu=0.3 kW/km
Vtot=29.4 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=25.9 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//36)°C:(0.124 + j0.124 // 0.149 + j0.124) Ohm/km
Theoret. zero imp.(20//32)°C:(0.267 + j0.178 // 0.272 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	53.6 °C

Current-carrying cap.: 335.3 A <=> 19.7 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	53.6	150	0.1404	335
2	17.0	0.0886		52.2			
3	32.2	0.3558		46.5			
4	33.5	0.0220		45.5			
5	34.1	0.0170		44.6			
6	36.1		0.0242	44.6	16	1.1819	18
8	36.5		0.0209	44.6	23	1.3688	16
9	92.7	0.1209		38.6	653		
10	100.7		0.0622	38.6	729	0.2052	69
13	107.9	0.0659		35.1			

2. C O N D U C T O R

Ro=0.1240 Ohm/km R'=0.1404 Ohm/km ys=0.0042 yp=0.0023 ks=1.00
kp=1.00 Rb=0.1413 Ohm/km Rz=0.0152 Ohm/km Rw=0.1564 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.402 K*m/W

4. L O S S E S O F S Y S T E M

Vc=47.7 kW/km Va=5.1 kW/km Vi=52.8 kW/km Vu=0.3 kW/km
Vtot=53.1 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=24.5 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//54)°C:(0.124 + j0.124 // 0.156 + j0.124) Ohm/km
Theoret. zero imp.(20//45)°C:(0.267 + j0.178 // 0.279 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	37.9 °C

Current-carrying cap.: 256.2 A <=> 15.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	37.9	150	0.1327	256
2	17.0	0.0886		37.1			
3	32.2	0.3558		34.0			
4	33.5	0.0220		33.4			
5	34.1	0.0170		32.9			
6	36.1		0.0267	32.9	16	1.1323	14
8	36.5		0.0231	32.9	23	1.3101	12
9	92.7	0.1209		29.5	653		
10	100.7		0.0671	29.5	729	0.1975	55
13	107.9	0.0659		27.6			

2. C O N D U C T O R
Ro=0.1240 Ohm/km R'=0.1327 Ohm/km ys=0.0047 yp=0.0025 ks=1.00
kp=1.00 Rb=0.1337 Ohm/km Rz=0.0156 Ohm/km Rw=0.1493 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.448 K*m/W

4. L O S S E S O F S Y S T E M
Vc=26.4 kW/km Va=3.0 kW/km Vi=29.4 kW/km Vu=0.3 kW/km
Vtot=29.7 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=25.8 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//38)°C:(0.124 + j0.124 // 0.149 + j0.124) Ohm/km
Theoret. zero imp.(20//33)°C:(0.267 + j0.178 // 0.273 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 150 RM/48 20/34 kV (S1670) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	56.3 °C

Current-carrying cap.: 335.1 A <=> 19.7 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	14.5		1.0000	56.3	150	0.1417	335
2	17.0	0.0886		54.9			
3	32.2	0.3558		49.2			
4	33.5	0.0220		48.1			
5	34.1	0.0170		47.3			
6	36.1		0.0238	47.3	16	1.1931	18
8	36.5		0.0205	47.3	23	1.3821	15
9	92.7	0.1209		41.2	653		
10	100.7		0.0613	41.2	729	0.2074	69
13	107.9	0.0659		37.7			

2. C O N D U C T O R

Ro=0.1240 Ohm/km R'=0.1417 Ohm/km ys=0.0041 yp=0.0022 ks=1.00
kp=1.00 Rb=0.1426 Ohm/km Rz=0.0151 Ohm/km Rw=0.1576 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.448 K*m/W

4. L O S S E S O F S Y S T E M

Vc=48.0 kW/km Va=5.1 kW/km Vi=53.1 kW/km Vu=0.3 kW/km
Vtot=53.4 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.2174 uF/km L=0.3960 mH/km X=0.1244 Ohm/km Il=1.34 A/km
Ie=4.0 A/km Pl=79.0 kVA/km Ik=24.3 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.61 kV/mm
Impedance (20//56)°C:(0.124 + j0.124 // 0.158 + j0.124) Ohm/km
Theoret. zero imp.(20//47)°C:(0.267 + j0.178 // 0.281 + j0.178) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	45.4 °C

Current-carrying cap.: 510.8 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	45.4	500	0.0403	511
2	29.1	0.0500		44.8			
3	44.3	0.2341		42.1			
4	45.6	0.0161		41.5			
5	46.2	0.0125		41.1			
6	48.2		0.1169	41.1	25	0.7468	42
8	48.6		0.0862	41.1	30	1.0133	31
9	121.6	0.1132		36.3	1045		
10	130.6		0.2564	36.3	1066	0.1390	146
13	138.8	0.0582		33.4			

2. C O N D U C T O R
Ro=0.0366 Ohm/km R'=0.0403 Ohm/km ys=0.0488 yp=0.0450 ks=1.00
kp=1.00 Rb=0.0440 Ohm/km Rz=0.0202 Ohm/km Rw=0.0643 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.374 K*m/W

4. L O S S E S O F S Y S T E M
Vc=34.5 kW/km Va=15.9 kW/km Vi=50.4 kW/km Vu=0.6 kW/km
Vtot=51.0 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=83.8 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//45)°C:(0.037 + j0.104 // 0.064 + j0.104) Ohm/km
Theoret. zero imp.(20//41)°C:(0.134 + j0.133 // 0.142 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	69.4 °C

Current-carrying cap.: 670.6 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	69.4	500	0.0437	671
2	29.1	0.0500		68.3			
3	44.3	0.2341		63.4			
4	45.6	0.0161		62.3			
5	46.2	0.0125		61.5			
6	48.2		0.1016	61.5	25	0.8022	52
8	48.6		0.0748	61.5	30	1.0901	38
9	121.6	0.1132		53.0	1045		
10	130.6		0.2354	53.0	1066	0.1487	183
13	138.8	0.0582		47.7			

2. C O N D U C T O R
Ro=0.0366 Ohm/km R'=0.0437 Ohm/km ys=0.0416 yp=0.0393 ks=1.00
kp=1.00 Rb=0.0472 Ohm/km Rz=0.0195 Ohm/km Rw=0.0667 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.374 K*m/W

4. L O S S E S O F S Y S T E M
Vc=63.6 kW/km Va=26.1 kW/km Vi=89.7 kW/km Vu=0.6 kW/km
Vtot=90.3 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=77.3 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//69)°C:(0.037 + j0.104 // 0.067 + j0.104) Ohm/km
Theoret. zero imp.(20//62)°C:(0.134 + j0.133 // 0.149 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	47.8 °C

Current-carrying cap.: 510.6 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	47.8	500	0.0406	511
2	29.1	0.0500		47.2			
3	44.3	0.2341		44.5			
4	45.6	0.0161		43.9			
5	46.2	0.0125		43.5			
6	48.2		0.1151	43.5	25	0.7532	42
8	48.6		0.0848	43.5	30	1.0222	31
9	121.6	0.1132		38.7	1045		
10	130.6		0.2541	38.7	1066	0.1404	145
13	138.8	0.0582		35.7			

2. C O N D U C T O R
Ro=0.0366 Ohm/km R'=0.0406 Ohm/km ys=0.0480 yp=0.0444 ks=1.00
kp=1.00 Rb=0.0444 Ohm/km Rz=0.0201 Ohm/km Rw=0.0645 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.420 K*m/W

4. L O S S E S O F S Y S T E M
Vc=34.8 kW/km Va=15.9 kW/km Vi=50.7 kW/km Vu=0.6 kW/km
Vtot=51.3 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=83.2 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//48)°C:(0.037 + j0.104 // 0.064 + j0.104) Ohm/km
Theoret. zero imp.(20//43)°C:(0.134 + j0.133 // 0.143 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 500 RM/75 20/34 kV (S1675) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	74 °C

Current-carrying cap.: 670.9 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	26.6		1.0000	74.0	500	0.0444	671
2	29.1	0.0500		72.9			
3	44.3	0.2341		67.9			
4	45.6	0.0161		66.8			
5	46.2	0.0125		66.0			
6	48.2		0.0988	66.0	25	0.8143	51
8	48.6		0.0727	66.0	30	1.1070	38
9	121.6	0.1132		57.4	1045		
10	130.6		0.2313	57.4	1066	0.1513	181
13	138.8	0.0582		52.1			

2. C O N D U C T O R

Ro=0.0366 Ohm/km R'=0.0444 Ohm/km ys=0.0404 yp=0.0383 ks=1.00
kp=1.00 Rb=0.0479 Ohm/km Rz=0.0193 Ohm/km Rw=0.0671 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.420 K*m/W

4. L O S S E S O F S Y S T E M

Vc=64.5 kW/km Va=26.1 kW/km Vi=90.6 kW/km Vu=0.6 kW/km
Vtot=91.2 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3305 uF/km L=0.3295 mH/km X=0.1035 Ohm/km Il=2.04 A/km
Ie=6.1 A/km Pl=120.0 kVA/km Ik=76.0 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.20 kV/mm
Impedance (20//74)°C:(0.037 + j0.104 // 0.067 + j0.104) Ohm/km
Theoret. zero imp.(20//66)°C:(0.134 + j0.133 // 0.151 + j0.133) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	40.4 °C

Current-carrying cap.: 510.9 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	40.4	630	0.0306	511
2	33.1	0.0437		40.0			
3	48.3	0.2105		38.0			
4	49.6	0.0148		37.6			
5	50.2	0.0115		37.3			
6	52.2		0.1425	37.3	25	0.7364	42
8	52.6		0.1137	37.3	33	0.9226	34
9	129.8	0.1071		33.4	1117		
10	139.3		0.3378	33.4	1230	0.1189	163
13	147.5	0.0546		31.0			

2. C O N D U C T O R
Ro=0.0283 Ohm/km R'=0.0306 Ohm/km ys=0.0822 yp=0.0798 ks=1.00
kp=1.00 Rb=0.0355 Ohm/km Rz=0.0211 Ohm/km Rw=0.0566 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.368 K*m/W

4. L O S S E S O F S Y S T E M
Vc=27.9 kW/km Va=16.5 kW/km Vi=44.4 kW/km Vu=0.6 kW/km
Vtot=45.0 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=107.3 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//40)°C:(0.028 + j0.099 // 0.057 + j0.099) Ohm/km
Theoret. zero imp.(20//37)°C:(0.115 + j0.122 // 0.120 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1000 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	59.7 °C

Current-carrying cap.: 670.3 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	59.7	630	0.0327	670
2	33.1	0.0437		59.0			
3	48.3	0.2105		55.4			
4	49.6	0.0148		54.7			
5	50.2	0.0115		54.1			
6	52.2		0.1275	54.1	25	0.7820	52
8	52.6		0.1016	54.1	33	0.9810	42
9	129.8	0.1071		47.4	1117		
10	139.3		0.3193	47.4	1230	0.1260	206
13	147.5	0.0546		43.1			

2. C O N D U C T O R

Ro=0.0283 Ohm/km R'=0.0327 Ohm/km ys=0.0724 yp=0.0722 ks=1.00
kp=1.00 Rb=0.0374 Ohm/km Rz=0.0205 Ohm/km Rw=0.0580 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.368 K*m/W

4. L O S S E S O F S Y S T E M

Vc=50.4 kW/km Va=27.6 kW/km Vi=78.0 kW/km Vu=0.6 kW/km
Vtot=78.6 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=100.7 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//60)°C:(0.028 + j0.099 // 0.058 + j0.099) Ohm/km
Theoret. zero imp.(20//54)°C:(0.115 + j0.122 // 0.126 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	42.5 °C

Current-carrying cap.: 510.8 A <=> 30.1 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	42.5	630	0.0308	511
2	33.1	0.0437		42.1			
3	48.3	0.2105		40.1			
4	49.6	0.0148		39.7			
5	50.2	0.0115		39.4			
6	52.2		0.1406	39.4	25	0.7421	42
8	52.6		0.1122	39.4	33	0.9299	33
9	129.8	0.1071		35.6	1117		
10	139.3		0.3357	35.6	1230	0.1200	161
13	147.5	0.0546		33.1			

2. C O N D U C T O R
Ro=0.0283 Ohm/km R'=0.0308 Ohm/km ys=0.0811 yp=0.0789 ks=1.00
kp=1.00 Rb=0.0357 Ohm/km Rz=0.0210 Ohm/km Rw=0.0568 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E
R(th) =0.413 K*m/W

4. L O S S E S O F S Y S T E M
Vc=27.9 kW/km Va=16.5 kW/km Vi=44.4 kW/km Vu=0.6 kW/km
Vtot=45.0 kW/km

5. C H A R A C T E R I S T I C V A L U E S
C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=106.6 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//42)°C:(0.028 + j0.099 // 0.057 + j0.099) Ohm/km
Theoret. zero imp.(20//39)°C:(0.115 + j0.122 // 0.121 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281

Ampacity acc. IEC 60287
Inquiry: GodeWind02

(F)2XS(FL)2Y>c 3 x 630 RM/75 20/34 kV (S1676) (Three phase system)

Cables laid in ground, depth of laying	1500 mm
Soil thermal resistivity of dry zone	0.7 K*m/W
Soil thermal resistivity of moist zone	0.7 K*m/W
Load factor	1
Ambient temperature	15 °C
Continuous operating temperature of conductor	63.5 °C

Current-carrying cap.: 670.2 A <=> 39.5 MVA Frequency 50 Hz

1. C A B L E

	D	R(th)	Lambda	T	A	R	I
	mm	K*m/W	pU	°C	mm²	Ohm/km	A
1	30.6		1.0000	63.5	630	0.0331	670
2	33.1	0.0437		62.8			
3	48.3	0.2105		59.2			
4	49.6	0.0148		58.4			
5	50.2	0.0115		57.8			
6	52.2		0.1246	57.8	25	0.7921	52
8	52.6		0.0993	57.8	33	0.9940	41
9	129.8	0.1071		51.1	1117		
10	139.3		0.3156	51.1	1230	0.1278	205
13	147.5	0.0546		46.7			

2. C O N D U C T O R

Ro=0.0283 Ohm/km R'=0.0331 Ohm/km ys=0.0707 yp=0.0708 ks=1.00
kp=1.00 Rb=0.0378 Ohm/km Rz=0.0204 Ohm/km Rw=0.0582 Ohm/km

3. E X T E R N A L T H E R M. R E S I S T A N C E

R(th) =0.413 K*m/W

4. L O S S E S O F S Y S T E M

Vc=51.0 kW/km Va=27.6 kW/km Vi=78.6 kW/km Vu=0.6 kW/km
Vtot=79.2 kW/km

5. C H A R A C T E R I S T I C V A L U E S

C=0.3675 uF/km L=0.3151 mH/km X=0.0990 Ohm/km Il=2.27 A/km
Ie=6.8 A/km Pl=133.5 kVA/km Ik=99.4 kA/sq. root(sec)
eps=2.5 tan d=0.004 Emax=3.13 kV/mm
Impedance (20//64)°C:(0.028 + j0.099 // 0.058 + j0.099) Ohm/km
Theoret. zero imp.(20//58)°C:(0.115 + j0.122 // 0.127 + j0.122) Ohm/km

Calculated by: ESE/Lepsy/2281