



# Traction cable

## RADOX RAILCAT CAT5e

### Product description:

**RADOX RAILCAT CAT5e** Multicore cables with overall screen  
 Impedance: 100 Ohm  
 Hazard level: M (extra low temperature, extra oil and extra fuel resistant)

### General features:

Halogen free electron- beam cross linked cables with improved behaviour in case of fire, easy to strip, soldering iron resistant and flexible. Meet the requirements of EN 50288- 2- 2 and IEC 61156- 6.

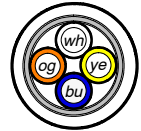
### Application:

The cables are intended for permanent installation in rail vehicles or for applications in which a limited alternating bending stress occur during service. (see table) Guidelines for selection and installation are described in the standard EN 50343.

### Marking:

[a] HUBER+SUHNER RADOX RAILCAT CAT5e [b] [c]- [d] [e] [f]

example:  
 [a] Meter marking (in m) = 1234 = m  
 [b] Construction 4x22AWG XM S  
 [c] Part number 12345678  
 [d] Batch number 1234567  
 [e] Production week and year 03- 2017  
 [f] Production place (only if China) CN



Construction	4x22AWG XM S RW	4x22AWG XM S RW E	4x22AWG XM S	4x22AWG XM S E	4x0.5 XM S
H+S part no. black	12 584 038	-	12 568 935	-	12 585 489
H+S part no. blue	85 068 348	85 065 038	85 068 347	84 142 178	85 068 349
<b>Construction</b>					
Conductor	Cu- Ag	Cu- Sn	Cu- Ag	Cu- Sn	Cu- Sn
Core insulation	RADOX FOAM	RADOX FOAM	RADOX COM	RADOX COM	RADOX COM
Core diameter	1.55 mm	1.55 mm	1.95 mm	1.95 mm	2.3 mm
Core colours	WH- BU, OG- YE	WH- BU,OG- YE	WH- BU, OG- YE	WH- BU, OG- YE	WH- BU, OG- YE
Tape	over quad	over quad	no	no	no
Laminated Al- tape	over quad	over quad	over quad	over quad	over quad
EMC- screen	Tin plated copper braid	Tin plated copper braid	Tin plated copper braid	Tin plated copper braid	Tin plated copper braid
Screen diameter	4.6 mm	4.6 mm	5.3 mm	5.3 mm	6.2 mm
Wrapping	Tape	Tape	Tape	Tape	Tape
Cable sheath	RADOX EM 104	RADOX EM 104	RADOX EM 104	RADOX EM 104	RADOX EM 104
<b>Cable diameter</b>	<b>6.6±0.4 mm</b>	<b>6.6±0.4 mm</b>	<b>7.25±0.3 mm</b>	<b>7.25±0.3 mm</b>	<b>8.3±0.3 mm</b>
<b>Type of installation</b>	fixed	fixed	flexible   fixed	flexible   fixed	fixed
<b>Temperature range</b>	- 50°C...+90°C	- 40°C...+70°C	- 40°C   - 50°C   +90°C   +90°C	- 40°C   - 50°C   +90°C   +90°C	- 50°C...+90°C
<b>Fireload</b>	580 kJ/m	580 kJ/m	745 kJ/m	745 kJ/m	1240 kJ/m
<b>Cable weight</b>	7 kg/100m	7 kg/100m	8.1 kg/100m	8.1 kg/100m	10.2 kg/100m
<b>Connector</b>	RJ 45 / M 12	RJ 45 / M 12	M 12	M 12	M 12

### Designation legend

X : Core insulation material is not defined in the standard EN 50264- 1  
 M : Sheet material EM 104 according to EN 50264- 1  
 S : Overall screen  
 RW : Cores with reduced wall thickness  
 E : Eco version

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The product fulfils the test and specification requirements described in this document for the stated areas of application and operating conditions. HUBER+SUHNER AG does not expressly or implicitly guarantee performance under additional or changed conditions. Deviations are to be agreed upon in writing.

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# Traction cable

## RADOX RAILCAT CAT5e

### General technical data:

Characteristic Impedance	f = 100MHz	100 ± 5	Ω
Resistance unbalance at 20 °C		≤ 1.1	Ω / km
Capacitance	core / core	< 56	pF / m
	core / screen	≤ 100	pF / m
Voltage rating		300	VAC
Test voltage, 50 Hz, 5 min.		2000	VAC
Screening attenuation	30 MHz ≤ f ≤ 100 MHz	40	dB
Transfer impedance	f ≤ 30 MHz	200	mΩ/m
Temperature range	fixed	- 50 ... + 90	°C
	sporadic movement	- 40 ... + 90	°C
Min. bending radius	fixed	6 x cable dia	
	sporadic movement	10 x cable dia (12568935 / 84142178 / 85086347)	

### Conditions:

The upper temperature limit is determined by long term ageing according to EN 50305 Par. 7 and extrapolation to 20,000 hours.

The lower temperature limit is determined by bending and elongation tests according to EN 60811-504/505, respectively low temperature behaviour tests according to GOST 20.57.406-81, method 204-1 and GOST 17491-80. (fixed installation)

The specified bending radii require a careful and proper handling using proven fastening technologies.

### The cables are developed to meet the requirements of the following standard:

Multi-element metallic cables used in analogue and digital communication and control - Part 2-2: Sectional specification for screened cables characterised up to 100 MHz - Work area and patch cord cables; German version EN 50288-2-2:

### Specific technical data: 12 584 038, 85 068 348

Conductor resistance at 20 °C	≤ 54.4	Ω / km
Signal propagation	75	%

Frequency (MHz)	Attenuation (db/100m)		NEXT(db) Pr/Pr		FEXT (db) Pr/Pr		Return loss (db)	
	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1	2.0	3.1	73	65.3	78	60.8	-	20
4	4.4	6	70	56.3	77	51.8	25	23
10	7.4	9.5	65	50.3	70	43.8	30	25
31.5	14	17.1	57	42.9	65	33.9	30	23.6
62.5	20	24.8	52	38.4	56	27.9	30	21.5
100	26	32.0	48	35.3	48	23.8	28	20.1

Max. / Min. : standard defaults

### Specific technical data: 85 065 038

Conductor resistance at 20 °C	≤ 54.7	Ω / km
Signal propagation	75	%

Frequency (MHz)	Attenuation (db/100m)		NEXT(db) Pr/Pr		FEXT (db) Pr/Pr		Return loss (db)	
	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1	2.5	3.1	68	65.3	80	60.8	-	20
4	5	6	63	56.3	67	51.8	25	23
10	7.5	9.5	60	50.3	57	43.8	27	25
31.5	12	17.1	50	42.9	46	33.9	27	23.6
62.5	17	24.8	40	38.4	42	27.9	24	21.5
100	23	32.0	38	35.3	36	23.8	23	20.1

Max. / Min. : standard defaults



# Traction cable

## RADOX RAILCAT CAT5e

### Specific technical data: 12 568 935, 85 068 347

Conductor resistance at 20 °C ..... ≤ 54.4 ..... Ω / km  
 Signal propagation ..... 66 ..... %

Frequency (MHz)	Attenuation (db/100m)		NEXT(db) Pr/Pr		FEXT (db) Pr/Pr		Return loss (db)	
	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1	2	3.1	80	65.3	80	60.8	-	20
4	4	6	76	56.3	70	51.8	35	23
10	6.5	9.5	67	50.3	65	43.8	35	25
31.5	10.5	17.1	60	42.9	58	33.9	35	23.6
62.5	14	24.8	56	38.4	59	27.9	33	21.5
100	18	32.0	53	35.3	67	23.8	33	20.1

Max. / Min. : standard defaults

### Specific technical data: 84 142 178

Conductor resistance at 20 °C ..... ≤ 54.7 ..... Ω / km  
 Signal propagation ..... 66 ..... %

Frequency (MHz)	Attenuation (db/100m)		NEXT(db) Pr/Pr		FEXT (db) Pr/Pr		Return loss (db)	
	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1	2	3.1	80	65.3	80	60.8	-	20
4	4	6	76	56.3	70	51.8	35	23
10	6.5	9.5	67	50.3	65	43.8	35	25
31.5	10.5	17.1	60	42.9	58	33.9	35	23.6
62.5	14	24.8	56	38.4	59	27.9	33	21.5
100	18	32.0	53	35.3	67	23.8	33	20.1

Max. / Min. : standard defaults

### Specific technical data: 12 585 489, 85 068 349

Conductor resistance at 20 °C ..... ≤ 40.1 ..... Ω / km  
 Signal propagation ..... 66 ..... %

Frequency (MHz)	Attenuation (db/100m)		NEXT(db) Pr/Pr		FEXT (db) Pr/Pr		Return loss (db)	
	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
1	2.0	3.1	70	65.3	80	60.8	-	20
4	4	6	68	56.3	70	51.8	25	23
10	6.5	9.5	65	50.3	65	43.8	34	25
31.5	10.5	17.1	53	42.9	55	33.9	34	23.6
62.5	14	24.8	49	38.4	50	27.9	30	21.5
100	18	32.0	45	35.3	45	23.8	28	20.1

Max. / Min. : standard defaults



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### The cables are in conformity with:

#### Fire protection on railway vehicles, category ..... **la, lb, II** ..... **BS 6853, GM/RT 2130**

Vertical flame spread	$50 < L \leq 540$ mm	EN 60332-1-2
Vertical flame spread, bunched	$L \leq 2.5$ m	EN 50266, BS 6853 An. D.8.7
Smoke density	$A_0 \leq$ BS 6853	BS 6853 An. D.8.7
Toxicity	$R \leq 1.0$	BS 6853 An. B.1

#### Fire protection on railway vehicles, hazard level ..... **HL1 - HL3** ..... **EN 45545**

Vertical flame spread	$50 < L \leq 540$ mm	EN 60332-1-2
Vertical flame spread, bunched, $6 < D < 12$ mm	$L \leq 2.5$ m	EN 50305, 9.1.1 (EN 60332-3-25)
Smoke density	$T \geq 70$ %	EN 61034-2
Toxicity	$ITC \leq 6$	EN 50305, 9.2

#### Fire protection on railway vehicles, level of protection ..... **1 - 4** ..... **DIN 5510**

Vertical flame spread	$50 < L \leq 540$ mm	EN 60332-1-2
Vertical flame spread, bunched, $6 < D < 12$ mm	$L \leq 2.5$ m	EN 60332-3-25
Smoke density	$T \geq 60$ %	EN 61034-2
Corrosivity of combustion gases	$pH \geq 4.3, C \leq 10$ $\mu$ S/mm	EN 50267-2-2
Amount of halogen acid gas	$HCl + HBr \leq 0.5$ %	EN 50267-2-1
Content of fluorine	$HF \leq 0.1$ %	EN 60684-2, 45.2
Toxicity	$ITC \leq 3$	EN 50305, 9.2

#### Fire protection on railway vehicles, category ..... **A1, A2, B** ..... **NF F16-101**

Fire protection on railway vehicles, class	C / F0	NF F16-101
Vertical flame spread	$50 < L \leq 540$ mm	NF C32-070, 2.1
Vertical flame spread, bunched	$L \leq 300$ mm	NF C32-070, 2.2
Smoke index	$I.F. \leq 5$	X10-702-2, NF X70-100-1

#### Fire protection on railway vehicles, hazard level ..... **LR1 - LR4** ..... **UNI CEI 11170**

Vertical flame spread	$50 < L \leq 540$ mm	EN 60332-1-2
Vertical flame spread, bunched, $6 < D < 12$ mm	$L \leq 2.5$ m	EN 60332-3-25
Smoke density	$T \geq 70$ %	EN 61034-2
Corrosivity of combustion gases	$pH \geq 4.3, C \leq 10$ $\mu$ S/mm	EN 50267-2-2
Amount of halogen acid gas	$HCl + HBr \leq 0.5$ %	EN 50267-2-1
Toxicity	$ITC \leq 3$	EN 50305, 9.2

#### Fire protection on railway vehicles ..... **Fulfilled** ..... **NFPA 130**

Vertical flame spread, bunched	$L \leq 1.5$ m	UL 1685, 12 (FT4 exp.)
Smoke density	$TSR \leq 150$ m <sup>2</sup> , $PSRR \leq 0.40$ m <sup>2</sup> /s	UL 1685, 12 (FT4 exp.)

#### Requirement of hazard level code M: (according to EN 50264-1 or EN 50306-1)

Extra low temperature	- 40°C
Extra oil resistance	IRM 902, 72h, 100°C
Extra fuel resistance	IRM 903, 168h, 70°C