Traction cable
RADOX 4 GKW-AX 1800V MM S

Product description:

RADOX 4 GKW-AX 1800V MM S	Single and multicore cables, screened (overall screen)
Nominal voltage:	1800 / 3000 V AC
Hazard level:	MM (extra low temperature, extra oil and extra fuel resistant)

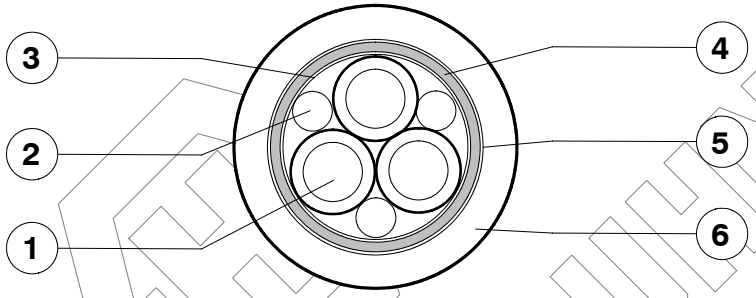
General features:

Halogen free, electron beam cross-linked cables with improved behaviour in case of fire, easy to strip, soldering iron resistant and flexible.

Application:

The cables are intended for permanent installation in rail vehicles or for applications in which a limited alternating bending stress occurs during service. Guidelines for selection and installation are described in the standards EN 50355 and EN 50343.

General composition of cable:



1.	RADOX 4 GKW-AX 1800V M cores	Conductor: stranded tin plated copper, acc. to EN 60228 cl. 5 Insulation: RADOX EI 110 / EI 109 Colours: black, numbered
2.	Filler (optional)	RADOX 125 REC
3.	Wrapping	Tape
4.	EMC-screen	Tin plated copper braid
5.	Wrapping	Tape
6.	Sheath	RADOX EM 104, colour: black

Marking: HUBER+SUHNER RADOX 4 GKW-AX 1800V nX[cross section] MM S [part. No. + batch. No.]

Technical Data :

Voltage rating cond.-earth	U_0	1800	V AC
Voltage rating cond.-cond.	U	3000	V AC
maximum permissible Voltage rating AC cond.-earth		2100	V AC
maximum permissible Voltage rating AC cond.-cond.	U_m	3600	V AC
maximum permissible Voltage rating DC cond.-earth	V_0	2700	V DC
maximum permissible Voltage rating DC cond.-cond.		4500	V DC
Test voltage		6500	V AC
Temperature range		- 50 ...+ 120	°C

Min. bending radius

fixed installation	cable diameter ≤ 12 mm	3 x D
	cable diameter > 12 mm	4 x D
sporadic movement	cable diameter ≤ 12 mm	4 x D
	cable diameter > 12 mm	5 x D

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NB:
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 60811-1-4 Par. 8, respectively low temperature behaviour tests for static conditions, e.g. for fixed installation according to GOST 20.57.406-81 - method 204-1 and GOST 17491-80.
The specified bending radii require a careful and proper handling using proven fastening technologies.

The cables are in conformity with:

Fire protection on railway vehicles, hazard level	**HL1 - HL3**	**EN 45545**
Vertical flame spread	50 < L ≤ 540 mm	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm	L ≤ 1.5 m	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm	L ≤ 2.5 m	EN 50305, 9.1.1 (EN 60332-3-25)
Vertical flame spread, bunched, D ≥ 12 mm	L ≤ 2.5 m	EN 60332-3-24
Smoke density	T ≥ 70 %	EN 61034-2
Toxicity	ITC ≤ 6	EN 50305, 9.2
Fire protection on railway vehicles, level of protection	**1 - 4**	**DIN 5510**
Vertical flame spread	50 < L ≤ 540 mm	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm	L ≤ 1.5 m	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm	L ≤ 2.5 m	EN 60332-3-25
Vertical flame spread, bunched, D ≥ 12 mm	L ≤ 2.5 m	EN 60332-3-24
Smoke density	T ≥ 60 %	EN 61034-2
Corrosivity of combustion gases	pH ≥ 4.3, C ≤ 10 µS/mm	EN 50267-2-2
Amount of halogen acid gas	HCl + HBr ≤ 0.5 %	EN 50267-2-1
Content of fluorine	HF ≤ 0.1 %	EN 60684-2, 45.2
Toxicity	ITC ≤ 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 ≤ 540 mm	NF C32-070, 2.1
Vertical flame spread, bunched	L ≤ 300 mm	NF C32-070, 2.2
Smoke index	I.F. ≤ 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 ≤ 540 mm	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm	L ≤ 1.5 m	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm	L ≤ 2.5 m	EN 60332-3-25
Vertical flame spread, bunched, D ≥ 12 mm	L ≤ 2.5 m	EN 60332-3-24
Smoke density	T ≥ 70 %	EN 61034-2
Corrosivity of combustion gases	pH ≥ 4.3, C ≤ 10 µS/mm	EN 50267-2-2
Amount of halogen acid gas	HCl + HBr ≤ 0.5 %	EN 50267-2-1
Toxicity, insulation	ITC ≤ 6	EN 50305, 9.2
Toxicity, filler and sheath	ITC ≤ 3	EN 50305, 9.2
Fire protection on railway vehicles, category	**Ia, Ib, II**	**BS 6853, GM/RT 2130**
Vertical flame spread	50 < L ≤ 540 mm	EN 60332-1-2
Vertical flame spread, bunched	L ≤ 2.5 m	EN 50266, BS 6853 An. D.8.7
Smoke density	A_0 ≤ BS 6853	BS 6853 An. D.8.7
Toxicity	R ≤ 1.0	BS 6853 An. B.1
Fire protection on railway vehicles	**Fulfilled**	**NFPA 130**
Vertical flame spread, bunched	L ≤ 1.5 m	UL 1685, 12 (FT4 exp.)
Smoke density	TSR ≤ 150 m^2, PSRR ≤ 0.40 m^2/s	UL 1685, 12 (FT4 exp.)

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Requirement of hazard level code M	(acc. 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

Applicable documents:

- EN 50355 Guide line for applications
- H+S 557 578 Current rating for single core cables
- H+S 563 053 Current rating for multi core cables

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Table 1 :

Construction n x mm²	Conductor dia.nom mm	Core dia.1) nom. mm	Screen nom. dia. mm	Screen nom. cross section mm²	Cable dia. mm	R_{20} 2) max. Ω/km	Z_T3) max. mΩ/m	C 4) core/core pF/m	C 4) core/screen pF/m	Fire load nom. kJ/m	Weight nom. copper kg/100m	Weight nom. cable kg/100m	H+S Part No.
6x0.5*	0.88	2.45	8.5	3.8	10.3±0.4	38.5	50	125	205	1465	6.5	17.2	85 006 150
1x1.5	1.52	3.35	3.8	0.9	5.4±0.15	13.7	70	-	310	375	2.2	5.1	12 556 535
2x1.5	1.52	3.35	7.3	2.1	9.6±0.3	13.7	70	135	230	1260	4.8	14	12 552 642
3x1.5	1.52	3.35	8.0	3.3	10.5±0.4	13.7	40	140	235	1480	7.2	18	12 566 644
5x1.5	1.52	3.35	10.5	5.5	13.4±0.4	13.7	40	130	225	2080	12	30	84 143 442
6x1.5	1.52	3.35	11.6	6.3	14.6±0.4	13.7	30	135	230	2730	15	34	12 564 185
8x1.5	1.52	3.35	14.0	8.3	17.4±0.5	13.7	30	120	200	4028	19	49	84 147 192
13x1.5	1.52	3.35	16.2	10.6	19.8±0.5	13.7	25	120	200	4629	28	64	84 147 191
36x1.5	1.52	3.35	25.6	20.7	30.6±0.6	13.7	20	120	200	10893	70.1	150	85 010 584
1x2.5	1.94	3.75	5.6	1.5	6.1±0.15	8.21	70	-	230	450	3.6	7.0	12 556 536
2x2.5	1.94	3.75	8.3	3.8	10.8±0.4	8.21	70	155	260	1560	8.1	20	12 583 411
3x2.5	1.94	3.75	8.9	3.8	11.6±0.4	8.21	70	150	255	1700	10	23	12 564 186
4x2.5	1.94	3.75	10.3	5.6	13.0±0.4	8.21	70	145	250	2095	14	30	12 586 442
30x2.5	1.94	3.75	25.8	20.7	30.7±0.6	8.21	20	-	-	10384	88.5	165	85 012 335
1x4	2.40	4.5	5.0	1.4	6.8±0.15	5.1	70	-	395	590	4.9	9.3	12 556 537
4x4	2.40	4.5	12.2	7.1	15.4±0.5	5.1	70	160	270	3020	21	43	12 568 683
1x6	2.93	5.2	5.7	1.6	7.7±0.15	3.39	70	-	420	755	6.7	12	12 556 538
3x6	2.93	5.2	12.2	7.1	15.4±0.5	3.39	70	170	285	3080	23	45	12 584 343
4x6	2.93	5.2	13.9	7.7	17.3±0.5	3.39	70	170	290	3790	29	56	12 586 443
1x10	3.89	6.4	7.0	2.1	9.2±0.2	1.95	80	-	490	1015	11	19	12 556 539
2x10	3.89	6.4	13.8	7.13	17.2±0.5	1.95	30	175	300	4087	26	54	85 068 014
3x10	3.89	6.4	14.8	8.3	18.3±0.5	1.95	30	210	355	4405	36	66	12 556 070
1x16	5.30	8.4	9.11	3.5	11.3±0.2	1.24	70	-	535	1550	17	28	12 556 540
3x16	5.30	8.4	19.4	13.5	23.4±0.5	1.24	30	200	340	6670	54	103	12 564 357
4x16	5.30	8.4	22.1	18.0	26.6±0.6	1.24	20	180	300	8375	72	133	12 584 305
1x25	6.6	10.2	10.9	4.2	13.7±0.3	0.8	70	-	570	2150	25	41	12 556 541
3x25	6.6	10.2	23.6	19.4	28.4±0.6	0.8	30	205	350	10065	81	153	12 564 358
4x25	6.6	10.2	27.3	18.4	33.0±0.6	0.8	30	210	355	13150	116	210	12 563 356
1x35	7.8	11.7	12.4	5.1	15.1±0.3	0.57	70	-	610	2560	35	54	12 556 542

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Construction n x mm²	Conductor dia.nom mm	Core dia.[1] nom. mm	Screen nom. dia. mm	Screen nom. cross section mm²	Cable dia. mm	R_{20} [2] max. Ω/km	Z_T[3] max. mΩ/m	C [4] core/core pF/m	C [4] core/screen pF/m	Fire load nom. kJ/m	Weight nom. copper kg/100m	Weight nom. cable kg/100m	H+S Part No.
2x35	7.8	11.7	24.8	19.4	29.8±0.6	0.57	20	225	380	11870	80	160	12 583 239
3x35	7.8	11.7	26.6	22.2	31.7±0.7	0.57	30	225	380	12340	112	200	12 561 687
3x35 +10	7.8 3.89	11.7 6.4	27.5	22.2	33.0±0.7	0.57 1.95	30	210	360	12800	122	214	12 563 359
4x35	7.8	11.7	30.9	33.2	37.2±0.7	0.57	20	210	360	16480	155	273	12 563 357
1x50	9.3	13.5	14.2	5.8	17.0±0.3	0.39	70	-	660	3030	53	71	12 556 543
2x50	9.3	13.5	28.9	30.6	34.3±0.6	0.39	20	240	405	14930	116	217	12 583 154
3x50 +10	9.3 3.89	13.5 6.4	31.0	33.2	37.0±0.7	0.39 1.95	30	230	390	13670	172	271	12 563 360
4x50	9.3	13.5	35.1	40.8	41.7±0.7	0.39	30	235	395	19890	217	360	12 552 458
1x70	11.4	15.8	16.7	8.3	19.5±0.3	0.28	70	-	760	3680	70	97	12 556 544
2x70	11.4	15.8	33.5	35.8	39.7±0.6	0.28	20	240	400	20270	159	360	85 002 075
3x70 +10	11.4 3.89	15.8 6.4	35.9	38.3	41.9±0.7	0.28 1.95	50	265	450	18740	230	365	12 551 966
4x70	11.4	15.8	41.4	40.8	47.9±0.7	0.28	60	250	425	25890	289	470	12 557 169
1x95	12.9	17.5	18.4	9.5	21.2±0.3	0.21	70	-	810	4195	88	119	12 556 545
1x95	12.9	17.5	18.4	9.5	21.2±0.3	0.21	70	-	810	4195	88	119	85074533[5]
3x95	12.9	17.5	39.6	40.8	46.7±0.7	0.21	40	260	445	22783	278	434	85 074 100
3x95 +10	12.9 3.89	17.5 6.4	39.6	40.8	46.7±0.7	0.21 1.95	40	260	445	20270	291	438	12 559 402
1x120	14.9	19.8	20.9	13.7	23.6±0.3	0.16	70	-	860	5040	114	152	12 556 546
1x150	16.8	22.1	23.2	16.0	26.2±0.3	0.13	70	-	890	6590	143	188	12 556 547
1x185	18.3	24.0	25.1	16.0	28.2±0.3	0.11	70	-	900	7290	170	220	12 556 548
1x240	21.1	27.0	28.3	20.8	31.4±0.3	0.082	70	-	995	8215	221	279	12 556 549
1x300	23.7	29.9	31.2	22.2	34.6±0.4	0.065	70	-	1060	9700	276	345	12 558 471
1x400	27.3	34.1	35.9	35.7	39.5±0.5	0.05	70	-	1115	15320	380	480	84 134 935

*SPEC: reduced diameter

1) Core details see H+S Datasheet 543 850
2) Conductor resistance at 20 °C according to EN 60228
3) Transfer impedance for f ≤ 30 MHz
4) Capacity typical value
5) Sheath colour green/yellow