



## Technical Reference

### Maximum resistance of conductor and armour for single-core cable having aluminum wire armour

Nominal cross sectional area of conductor	Maximum resistance per km of cable at 20 °C					
	Copper conductor	Aluminum conductor	Aluminum wire armour			
			Cables with stranded copper conductor		Cables with solid aluminum conductor	
			600/1000 V	1900/3300 V	600/1000 V	1900/3300 V
mm <sup>2</sup>	Ω	Ω	Ω	Ω	Ω	Ω
50	0.387	0.641	1.3	0.75	1.4	0.79
70	0.268	0.443	0.75	0.67	0.84	0.73
95	0.193	0.32	0.67	0.61	0.75	0.67
120	0.153	0.253	0.61	0.42	0.69	0.47
150	0.124	0.206	0.42	0.39	0.47	0.43
185	0.0991	0.164	0.38	0.37	0.42	0.4
240	0.0754	0.125	0.34	0.34	0.38	0.37
300	0.0601	0.1	0.31	0.31	0.35	0.34
400	0.047	—	0.22	0.22	—	—
500	0.0366	—	0.2	0.2	—	—
630	0.0283	—	0.18	0.18	—	—
800	0.0221	—	0.13	0.13	—	—
1 000	0.0176	—	0.12	0.12	—	—

### Maximum resistance of conductor and armour for two-, three-, four- and five-core cables having wire armour

#### 1) With stranded copper conductor

Nominal cross sectional area of conductor	Maximum resistance per km of cable at 20 °C						
	Copper conductor	Aluminum conductor	Steel wire armour				
			Cables with stranded copper conductors				
			Two-core	Three-core		Four-core	Five-core
mm <sup>2</sup>	Ω	Ω	600/1000 V	600/1000 V	1900/3300 V	600/1000 V	600/1000 V
mm <sup>2</sup>	Ω	Ω	Ω	Ω	Ω	Ω	Ω
1.5	12.1	—	10.2	9.5	—	8.8	8.2
2.5	7.41	—	8.8	8.2	—	7.7	6.8
4	4.61	—	7.9	7.5	—	6.8	6.2
6	3.08	—	7	6.7	—	4.3	3.9
10	1.83	—	6	4	—	3.7	3.4
16	1.15	1.91	3.7	3.5	1.9	3.1	2.2





Nominal cross sectional area of conductor	Maximum resistance per km of cable at 20 °C							
	Copper conductor	Aluminum conductor	Steel wire armour					
			Cables with stranded copper conductors					
			Two-core	Three-core		Four-core	Five-core	
600/1000 V	600/1000 V	1900/3300 V	600/1000 V	600/1000 V				
mm <sup>2</sup>	Ω	Ω	Ω	Ω	Ω	Ω	Ω	
25	0.727	1.2	3.7	2.5	1.7	2.0	2.3	1.8
35	0.524	0.868	2.6	2.3	1.8	—	—	1.6
50	0.387	0.641	2.3	2	1.3	1.8	—	1.1
70	0.268	0.443	2	1.8	1.2	1.2	—	0.94
95	0.193	0.32	1.4	1.3	1.1	1.1	—	—
120	0.153	0.253	1.3	1.2	0.76	0.76	—	—
150	0.124	0.206	1.2	0.78	0.71	0.68	—	—
185	0.099 1	0.164	0.82	0.71	0.65	0.61	—	—
240	0.075 4	0.125	0.73	0.63	0.59	0.54	—	—
300	0.060 1	0.1	0.67	0.58	0.55	0.49	—	—
400	0.047 0	—	0.59	0.52	0.5	0.35	—	—

## 2) With solid aluminum conductor

Nominal cross-sectional area of conductor	Maximum resistance per km of cable at 20 °C					
	Copper conductor	Aluminum conductor	Steel wire armour			
			Cables with solid aluminum conductors			
			Two-core	Three-core		Four-core
600/1000 V	600/1000 V	1900/3300 V	600/1000 V			
mm <sup>2</sup>	Ω	Ω	Ω	Ω	Ω	Ω
1.5	12.1	—	—	—	—	—
2.5	7.41	—	—	—	—	—
4	4.61	—	—	—	—	—
6	3.08	—	—	—	—	—
10	1.83	—	—	—	—	—
16	1.15	1.91	4	3.8	2	3.4
25	0.727	1.2	4.1	2.7	1.9	2.4
35	0.524	0.868	2.9	2.5	1.9	2.2
50	0.387	0.641	2.6	2.2	1.4	1.9
70	0.268	0.443	2.3	1.9	1.3	1.3
95	0.193	0.32	1.6	1.4	1.2	1.2
120	0.153	0.253	—	1.2	0.82	0.82
150	0.124	0.206	—	0.86	0.76	0.74
185	0.099 1	0.164	—	0.76	0.71	0.67
240	0.075 4	0.125	—	0.68	0.64	0.59
300	0.060 1	0.1	—	0.63	0.59	0.54
400	0.047 0	—	—	—	—	—





### 3) With Lead Sheath

Nominal area of conductor mm <sup>2</sup>	600/1000 V								1900/3300 V	
	Single core		Two core		Three core		Four core		Three core	
	Lead	Armour	Lead	Armour	Lead	Armour	Lead	Armour	Lead	Armour
1.5	-	-	8.98	6.21	8.54	5.96	7.72	5.59	-	-
2.5	-	-	7.56	5.51	7.09	5.26	6.29	4.84	-	-
4	-	-	6.37	4.88	6.27	4.81	5.41	4.31	-	-
6	-	-	5.85	4.59	5.40	4.31	4.91	3.02	-	-
10	-	-	4.91	4.01	4.71	2.93	4.10	2.63	-	-
16	8.14	0.62	4.29	3.10	4.11	2.64	3.31	2.36	2.42	1.37
25	6.63	0.54	3.21	2.64	2.96	1.58	2.93	1.57	1.97	1.22
35	6.01	0.50	2.60	1.69	2.41	1.42	2.38	1.41	1.68	1.13
50	5.24	0.47	3.19	1.88	2.37	1.40	1.96	1.27	1.61	0.84
70	4.56	0.42	2.52	1.64	1.95	1.27	1.59	0.87	1.54	0.81
95	4.07	0.39	2.10	1.14	1.60	0.87	1.30	0.77	1.37	0.77
120	3.30	0.35	1.89	1.04	1.32	0.78	1.11	0.57	1.10	0.54
150	3.03	0.32	1.58	0.95	1.13	0.58	0.88	0.51	1.00	0.52
185	2.48	0.29	1.33	0.69	0.89	0.52	0.75	0.47	0.86	0.48
240	2.03	0.26	1.02	0.61	0.76	0.47	0.61	0.42	0.73	0.43
300	1.86	0.24	0.87	0.55	0.62	0.42	0.53	0.38	0.61	0.40
400	1.41	0.17	-	-	0.53	0.39	0.43	0.26	0.53	0.37
500	1.16	0.15	-	-	-	-	-	-	-	-
630	0.98	0.13	-	-	-	-	-	-	-	-
800	0.76	0.09	-	-	-	-	-	-	-	-
1000	0.65	0.08	-	-	-	-	-	-	-	-

## Electrical Properties(600/1000 V)

### 1) Single core with copper conductor

Nominal area of conductor mm <sup>2</sup>	Single Core Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground amps	In single way ducts amps	Installed in air amps	Ground mV	Duct mV	Air mV
50	235	235	222	0.87	0.93	0.87
70	290	280	285	0.62	0.70	0.62
95	345	330	346	0.47	0.56	0.47
120	390	370	402	0.39	0.48	0.39
150	435	405	463	0.33	0.43	0.33
185	490	440	529	0.28	0.39	0.28
240	560	500	625	0.24	0.35	0.24





Nominal area of conductor	Single Core Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
300	630	550	720	0.21	0.32	0.21
400	700	580	815	0.20	0.30	0.20
500	770	620	918	0.18	0.28	0.18
630	840	670	1027	0.17	0.26	0.17
800	888	692	1119	0.17	0.25	0.17
1000	942	735	1214	0.16	0.24	0.16

## 1) Single core with aluminum conductor

Nominal area of conductor	Single Core Aluminum Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
50	175	180	162	1.40	1.60	1.40
70	220	220	207	0.98	1.00	0.98
95	260	260	252	0.72	0.79	0.74
120	295	295	292	0.58	0.66	0.60
150	330	330	337	0.48	0.57	0.49
185	375	365	391	0.39	0.49	0.41
240	435	410	465	0.31	0.42	0.34
300	490	455	540	0.27	0.38	0.29
400	540	480	625	0.35	0.38	0.25
500	580	510	714	0.31	0.35	0.22
630	630	540	801	0.28	0.32	0.20

## 2) Two cores with copper conductor

Nominal area of conductor	Two Cores Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
16*	140	115	115	2.9	2.9	2.9
25*	180	145	152	1.9	1.9	1.9
35*	215	175	188	1.3	1.3	1.3
50	255	210	228	1.0	1.0	1.0
70	315	260	291	0.7	0.7	0.7





Nominal area of conductor	Two Cores Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
95	381	313	354	0.5	0.5	0.5
120	410	344	430	0.4	0.4	0.4
150	472	384	480	0.4	0.4	0.4
185	539	432	540	0.3	0.3	0.3
240	636	504	630	0.2	0.2	0.2
300	732	560	700	0.2	0.2	0.2

## 2) Two cores with aluminum conductor

Nominal area of conductor	Two Cores Aluminum Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
25*	135	110	112	3.1	3.1	3.1
35*	165	130	138	2.2	2.2	2.2
50	195	155	166	1.7	1.7	1.7
70	240	195	211	1.1	1.1	1.1
95	288	237	254	0.8	0.8	0.8

## 3) Three cores with copper conductor

Nominal area of conductor	Three Cores Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
16	115	94	99	2.5	2.5	2.5
25	150	125	131	1.7	1.7	1.7
35	180	150	162	1.2	1.2	1.2
50	215	175	197	0.9	0.9	0.9
70	265	215	251	0.6	0.6	0.6
95	315	260	304	0.5	0.5	0.5
120	360	300	353	0.4	0.4	0.4
150	405	335	406	0.3	0.3	0.3
185	460	380	463	0.3	0.3	0.3
240	530	440	546	0.2	0.2	0.2
300	590	495	628	0.2	0.2	0.2
400	667	570	728	0.2	0.2	0.2





### 3) Three cores with aluminum conductor

Nominal area of conductor	Three Cores Aluminum Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
16	89	72	74	4.2	4.2	4.2
25	115	94	98	2.7	2.7	2.7
35	135	110	120	1.9	1.9	1.9
50	165	135	145	1.4	1.4	1.4
70	200	165	185	1.0	1.0	1.0
95	240	200	224	0.7	0.7	0.7
120	275	230	264	0.6	0.6	0.6
150	310	255	305	0.5	0.5	0.5
185	350	295	350	0.4	0.4	0.4
240	410	340	418	0.3	0.3	0.3
300	460	385	488	0.3	0.3	0.3
400	520	443	562	0.2	0.2	0.2

### 4) Four cores with copper conductor

Nominal area of conductor	Four Cores Stranded Copper Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
16	115	94	99	2.5	2.5	2.5
25	150	125	131	1.7	1.7	1.7
35	180	150	162	1.2	1.2	1.2
50	215	175	197	0.9	0.9	0.9
70	265	215	251	0.6	0.6	0.6
95	315	260	304	0.5	0.5	0.5
120	360	300	353	0.4	0.4	0.4
150	405	335	406	0.3	0.3	0.3
185	460	380	463	0.3	0.3	0.3
240	530	440	546	0.2	0.2	0.2
300	590	495	628	0.2	0.2	0.2
400	667	570	728	0.2	0.2	0.2
500	720	605	800	0.2	0.2	0.2







## 4) Four cores with aluminum conductor

Nominal area of conductor	Four Cores Aluminum Conductors					
	Current Ratings			Approximate voltage drop per ampere per metre		
	Direct in ground	In single way ducts	Installed in air	Ground	Duct	Air
mm <sup>2</sup>	amps	amps	amps	mV	mV	mV
16	89	72	74	4.2	4.2	4.2
25	115	94	98	2.7	2.7	2.7
35	135	110	120	1.9	1.9	1.9
50	165	135	145	1.4	1.4	1.4
70	200	165	185	1.0	1.0	1.0
95	240	200	224	0.7	0.7	0.7
120	275	230	264	0.6	0.6	0.6
150	310	255	305	0.5	0.5	0.5
185	350	295	350	0.4	0.4	0.4
240	410	340	418	0.3	0.3	0.3
300	460	385	488	0.3	0.3	0.3
400	520	443	562	0.2	0.2	0.2
500	561	470	618	0.2	0.2	0.2

## Electrical Properties(1900/3300 V)

Nominal area of conductor	Single Core Stranded Copper Conductors			Nominal area of conductor	Three Core Stranded Copper Conductors		
	Current Ratings				Current Ratings		
	Direct in ground	In single way ducts	Installed in air		Direct in ground	In single way ducts	Installed in air
mm <sup>2</sup>	amps	amps	amps	mm <sup>2</sup>	amps	amps	amps
50	222	219	228	16	114	96	106
70	271	264	285	25	147	124	142
95	324	310	350	35	175	147	168
120	366	342	407	50	207	174	202
150	409	376	463	70	254	214	255
185	460	414	528	95	304	257	312
240	528	464	623	120	345	293	361
300	589	506	710	150	387	328	410
400	651	535	808	185	436	371	471
500	720	579	915	240	502	428	554
630	789	624	1030	300	563	480	634
800	831	650	1119	-	-	-	-
1000	880	689	1214	-	-	-	-





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