

Armoured Power & Control Cables to BS6883

Low Smoke Zero Halogen

Single Core - T.A.C EPR, SW4, WB, SW4 600/1000V

Multi-Core - T.A.C EPR, SW4, GSWB, SW4 600/1000V



Application

Armoured cables for fixed wiring in ships, and in mobile and fixed offshore units (e.g. drilling rigs, oil platforms, etc.). For use in regularly occupied areas such as accommodation facilities, control rooms and computer suites. Any application where life may be endangered by smoke and noxious fumes, and where vital, sensitive equipment may be damaged by acid forming gases.

Specifications

- In accordance with BS 6883.
- **Conductor:** Tinned annealed copper. Stranded to BS EN 60228 Class II or flexible to BS EN 60228 Class V. Class II flexible can be supplied where required on 6sqmm and above.
- **Insulation:** EPR complying with BS7655 GP4.
- **Core Identification:** The cores shall be identified by numbers unless requested otherwise.
- **Inner Sheath:** Will be the same material as the outer sheath, based generally on the requirements of BS7655 section 2.6 Type SW4. Enhanced oil resistance, low smoke zero halogen, minimum tear resistance.
- **Armour:** wire braid in the following optional materials:
 - Galvanised mild steel to BS EN 10257-1
 - Tinned phosphor Bronze to BS EN 12166
 - Copper to BS EN 13602
- **Outer Sheath:** As inner sheath. Identification, Legend will include manufacturers name, voltage, BS6883, number of cores and c.s.a. cable sheath class (e.g. SW4), IEC 60332 and UK00A code where applicable.
- Standard sheath colour is black. Other colours available on request.
- Oxygen index > 32%. Temperature index 250°C, HCL emission < 0.5% of weight of compound at 800°C.
- Flame retardant to IEC60332-3-22 Category A (reduced propagation).
- **Temperature Rating:** 90°C maximum conductor operating temperature.
- **Voltage Rating:** 600/1000V.

N.B. Galvanised mild steel should not be used on single core cables where used for a.c. circuits.

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Multi-Core - T.A.C EPR, SW4, GSWB, SW4 600/1000V

Anixter Number	UK00A Code	Nominal Cond Area mm ²	Nominal Cond Stranding #/mm	Diameter Over Inner Sheath		Minimum O/D mm	Maximum O/D mm	Approx Weight kg/km	Anixter No Prysmian E1XF Gland	Anixter Number Hawke Gland
				Minimum mm	Maximum mm					
Single core										
A10FM-010500-02	WA150	50	19/1.78	13.7	15.2	18.1	20.1	846	-25	-25
A10FM-010700-02	WA170	70	19/2.14	15.4	17.1	19.9	22.4	1102	-25	-25
A10FM-010950-02	WA195	95	37/1.78	17.7	19.4	22.4	24.9	1422	-25	-25
A10FM-011200-02	WA10A	120	37/2.03	19.6	21.5	24.5	27.0	1761	-32	-32
A10FM-011500-02	WA10B	150	37/2.25	21.6	23.7	26.8	29.4	2124	-32	-32
A10FM-011850-02	WA10C	185	37/2.52	24.0	26.3	30.0	33.3	2694	-32	-32
A10FM-012400-02	WA10D	240	61/2.25	27.1	29.4	33.3	36.6	3413	-40	-40
A10FM-013000-02	WA10E	300	61/2.52	30.0	32.9	36.5	40.0	4173	-40	-40
Two core										
A10FM-020015F-02	WB202	1.5	30/0.25	8.4	9.5	12.4	14.0	268	-20S	-20S
A10FM-020025-02	WB203	2.5	7/0.67	9.2	10.3	13.2	14.7	314	-20S	-20S
A10FM-020040-02	WB204	4.0	7/0.85	11.3	12.6	15.5	17.2	430	-20	-20
A10FM-020060-02	WB206	6.0	7/1.04	12.4	13.8	16.8	18.5	523	-20	-20
A10FM-020100-02	WB210	10	7/1.35	14.5	15.9	18.9	20.6	687	-25	-25
A10FM-020160-02	WB216	16	7/1.70	16.8	18.3	21.3	23.5	925	-25	-25
A10FM-020250-02	WB225	25	19/1.35	20.5	22.4	25.4	27.9	1365	-32	-32
Three core										
A10FM-030015F-02	WB302	1.5	30/0.25	8.9	10.0	12.9	14.4	298	-20S	-20S
A10FM-030025-02	WB303	2.5	7/0.67	9.8	11.0	14.0	15.5	360	-20S	-20S
A10FM-030040-02	WB304	4.0	7/0.85	12.0	13.4	16.2	17.9	490	-20	-20
A10FM-030060-02	WB306	6.0	7/1.04	13.2	14.6	17.6	19.4	601	-25	-25
A10FM-030100-02	WB310	10.0	7/1.35	15.4	17.0	19.9	22.2	821	-25	-25
A10FM-030160-02	WB316	16.0	7/1.70	17.9	19.4	22.6	24.8	1113	-25	-25
A10FM-030250-02	WB325	25.0	19/1.35	22.1	24.1	27.2	29.8	1687	-32	-32
A10FM-030350-02	WB335	35.0	19/1.53	24.1	26.1	30.1	33.1	2120	-32	-32
A10FM-030500-02	WB350	50.0	19/1.78	27.8	29.8	34.0	36.9	2736	-40	-40
A10FM-030700-02	WB370	70.0	19/2.14	31.9	34.3	38.5	41.8	3660	-50S	-40
A10FM-030950-02	WB395	95.0	37/1.78	36.8	39.2	43.8	47.2	4773	-50	-50
A10FM-031200-02	WB30A	120.0	37/2.03	40.6	43.4	48.0	51.9	5925	-50	-50
A10FM-031500-02	WB30B	150.0	37/2.25	45.0	47.9	52.7	56.8	7178	-63S	-63
A10FM-031850-02	WB30C	185.0	37/2.52	50.2	53.6	58.3	62.9	8881	-63	-63
A10FM-032400-02	WB30D	240.0	61/2.25	56.8	60.3	65.3	70.1	11325	-75S	-75

Continued overleaf . . .

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Single Core - T.A.C EPR, SW4, WB, SW4 600/1000V

Multi-Core - T.A.C EPR, SW4, GSWB, SW4 600/1000V

Anixter Number	UK00A Code	Nominal Cond Area mm ²	Nominal Cond Stranding #/mm	Diameter Over Inner Sheath		Minimum O/D mm	Maximum O/D mm	Approx Weight kg/km	Anixter No Prysmian E1XF Gland	Anixter No Hawke Gland
				Minimum mm	Maximum mm					
									E1BP-E1XF	E1DZ-UNI
Four core										
A10FM-040015F-02	WB402	1.5	30/0.25	9.7	10.9	13.9	15.4	342	-20S	-20S
A10FM-040025-02	WB403	2.5	7/0.67	10.7	12.0	14.9	16.4	419	-20	-20
A10FM-040040-02	WB404	4.0	7/0.85	13.2	14.6	17.6	19.3	586	-20	-20
A10FM-040060-02	WB406	6.0	7/1.04	14.7	16.2	19.3	21.1	737	-25	-25
A10FM-040100-02	WB410	10.0	7/1.35	17.2	18.7	21.9	24.1	1013	-25	-25
A10FM-040160-02	WB416	16.0	7/1.70	19.9	21.8	24.8	27.1	1382	-32	-32
A10FM-040250-02	WB425	25.0	19/1.35	24.6	26.6	30.6	33.6	2191	-40	N/A
A10FM-040350-02	WB435	35.0	19/1.53	26.9	28.9	33.1	36.0	2654	-40	-40
A10FM-040500-02	WB450	50.0	19/1.78	30.9	33.3	37.5	40.6	3434	-50S	-40
A10FM-040700-02	WB470	70.0	19/2.14	35.5	37.9	42.4	46.0	4625	-50	-50
A10FM-040950-02	WB495	95.0	37/1.78	40.9	43.7	48.3	52.1	6020	-50	-50
A10FM-041200-02	WB40A	120.0	37/2.03	45.4	48.3	53.1	57.2	7525	-63S	-63
A10FM-041500-02	WB40B	150.0	37/2.25	50.3	53.5	58.4	62.9	9125	-63	-63
A10FM-041850-02	WB40C	185.0	37/2.52	56.0	59.5	64.5	69.4	11221	-75S	-75

Armoured Power and Control Cables to BS6883

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Single Core - T.A.C EPR, SW4, WB, SW4 600/1000V

Multi-Core - T.A.C EPR, SW4, GSWB, SW4 600/1000V

Anixter Number	UK00A Code	Nominal Cond Area mm ²	Nominal Cond Stranding #/mm	Diameter Over Inner Sheath		Minimum O/D	Maximum O/D	Approx Weight	Anixter No Prysmian E1XF Gland	Anixter Number Hawke Gland
				Minimum mm	Maximum mm	mm	mm	kg/km		
Seven core 6587										
A10FM-070015F-02	WB702	1.5	30/0.25	11.8	13.2	16.0	17.7	476	-20	-20
A10FM-070025-02	WB703	2.5	7/0.67	13.1	14.4	17.4	19.1	590	-20	-20
Twelve core 6580/12										
A10FM-120015F-02	WBA02	1.5	30/0.25	15.7	17.2	20.2	22.4	732	-25	-25
A10FM-120025-02	WBA03	2.5	7/0.67	17.7	19.3	22.4	24.8	935	-25	-25
Nineteen core 6580/19										
A10FM-190015F-02	WBB02	1.5	30/0.25	18.6	20.1	22.5	24.8	935	-25	-25
A10FM-190025-02	WBB03	2.5	7/0.67	20.9	22.7	25.8	28.0	1287	-32	-32
Twenty seven core 6580/27										
A10FM-270015F-02	LBC02	1.5	30/0.25	22.7	24.5	27.8	30.0	1359	-32	-32
A10FM-270025-02	LBC03	2.5	7/0.67	25.4	27.6	31.4	34.5	1854	-40	-40
Thirty seven core 6580/37										
A10FM-370015F-02	LBD02	1.5	30/0.25	25.5	27.3	31.5	34.2	1805	-40	-40
A10FM-370025-02	-	2.5	7/0.67	28.7	30.9	34.9	38.1	2349	-40	-40

For further technical information refer to page 6:31.

Technical Information

Single Core Cables, EPR Insulated

Continuous current ratings for groups of circuits (up to 6 cables bunched) for single core EPR insulated cables, run open or enclosed. Also applicable to mica tape fire resistant types.

CURRENT RATINGS

Nominal Conductor Area mm ²	Current Rating Single Phase a.c. or d.c., or Three Phase a.c. A	Voltage Drop Per Ampere Per Metre			
		d.c.	Single Phase a.c.	Three Phase a.c.	
		mV	mV	mV	
1.0	17	53	53	46	
1.5	21	34	34	29	
2.5	30	18	18	16	
4.0	40	12	12	10	
6.0	51	7.6	7.6	6.6	
10	71	4.5	4.5	3.9	
16	95	2.7	2.7	2.3	
25	125	1.7	1.7	1.5	
35	155	1.2	1.2	1.1	
50	190	0.96	0.98	0.87	
70	240	0.67	0.69	0.63	
95	290	0.48	0.52	0.49	
120	340	0.38	0.42	0.43	
150	385	0.31	0.36	0.38	
185	440	0.25	0.32	0.34	
240	520	0.19	0.27	0.31	
300	590	0.15	0.24	0.29	
	d.c.	a.c.			
400	690	670	0.12	0.23	0.28
500	780	720	0.093	0.22	0.27
630	890	780	0.071	0.21	0.26

Where more than six cables are bunched, a rating factor of 0.85 should be applied to the current rating.

For ambient temperatures other than 45°C, the following rating factors should be applied:

Ambient air temp °C	35	40	45	50	55	60	65	70	75	80
Rating factor	1.11	1.05	1.0	0.94	0.88	0.82	0.75	0.67	0.58	0.47

Technical Information

Twin & Multi-Core Cables, EPR Insulated

Continuous current ratings for groups of circuits (up to six cables bunched) for twin and multi-core EPR insulated cables, run open or enclosed. Also applicable to mica taped fire resistant types.

CURRENT RATINGS

Nominal Conductor Area mm ²	Twin Cables				Three & Four Core Cables	
	Current Rating Single Phase a.c. or d.c.	Voltage Drop Per Ampere Per Metre		Current Rating Three Phase a.c.	Voltage Drop Per Ampere Per Metre	
		d.c.	Single Phase a.c.			
1.0	14	54	54	12	47	
1.5	18	35	35	15	30	
2.5	25	18	18	21	16	
4.0	34	12	12	29	10	
6.0	43	7.8	7.8	36	6.7	
10	60	4.6	4.6	50	4.0	
16	81	2.7	2.7	67	2.3	
25	105	1.7	1.7	89	1.5	
35	135	1.2	1.2	105	1.1	
50	165	0.98	1.0	135	0.89	
70	200	0.68	0.70	170	0.64	
95	250	0.49	0.53	205	0.50	
120	290	0.39	0.43	240	0.44	
150	330	0.31	0.36	270	0.38	
185	370	0.25	0.32	305	0.34	
240	445	0.19	0.27	365	0.31	
300	505	0.15	0.24	415	0.29	

Where more than six cables are bunched, a rating factor of 0.85 should be applied to the current rating.

For ambient temperatures other than 45°C, the following rating factors should be applied:

Ambient air temp °C	35	40	45	50	55	60	65	70	75	80
Rating factor	1.11	1.05	1.0	0.94	0.88	0.82	0.75	0.67	0.58	0.47

Technical Information

600/1000V EPR Insulated cables to BS 6883 Armoured & Non-Armoured, Single Core

CABLE TYPES:

Single core TCU/EPR/SW4 "6571" Type 600/1000V to BS6883

Single core TCU/EPR/SW4/PBWB/SW4 "6591" Type 600/1000V to BS6883

ELECTRICAL CHARACTERISTICS

Conductor Size	Maximum d.c. Conductor Resistance @ 20°C	Maximum a.c. Conductor Resistance @ 90°C		Reactance @ 60 Hz Single Core Cables in Trefoil		Impedance @ 90°C, 60 Hz Single Core Cables in Trefoil	
		Unarmoured	Armoured	Unarmoured	Armoured	Unarmoured	Armoured
mm ²	ohms/km	ohms/km	ohms/km	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.2	15.6	15.6	0.178	0.222	15.6	15.6
2.5	7.56	9.64	9.64	0.165	0.207	9.64	9.64
4.0	4.70	5.99	5.99	0.159	0.196	5.99	5.99
6.0	3.11	3.97	3.97	0.150	0.184	3.97	3.97
10	1.84	2.35	2.35	0.139	0.177	2.35	2.35
16	1.16	1.48	1.48	0.132	0.161	1.48	1.49
25	0.734	0.935	0.936	0.124	0.150	0.943	0.948
35	0.529	0.673	0.674	0.120	0.145	0.684	0.689
50	0.391	0.499	0.499	0.119	0.141	0.513	0.519
70	0.270	0.344	0.344	0.113	0.134	0.362	0.369
95	0.195	0.271	0.271	0.111	0.130	0.293	0.301
120	0.154	0.214	0.214	0.108	0.127	0.240	0.249
150	0.126	0.175	0.175	0.108	0.126	0.206	0.215
185	0.100	0.140	0.140	0.108	0.126	0.177	0.188
240	0.0762	0.108	0.108	0.106	0.123	0.151	0.163
300	0.0607	0.0864	0.087	0.105	0.121	0.136	0.149
400	0.0475	0.0693	0.069	0.104	0.119	0.125	0.138
500	0.0369	0.0576	0.058	0.103	0.117	0.118	0.131
630	0.0286	0.0436	0.045	0.101	0.114	0.110	0.123

Technical Information

600/1000V EPR Insulated cables to BS 6883 Armoured & Non-Armoured, Multi-Core

CABLE TYPES:

Multi-Core TCU/EPR/SW4 "657*" Type 600/1000V to BS6883

Multi-Core TCU/EPR/SW4/GSWB/SW4 "658*" Type to BS6883

ELECTRICAL CHARACTERISTICS

Conductor Size	Maximum d.c. Conductor Resistance @ 20°C	Maximum a.c. Conductor Resistance @ 90°C	Reactance @ 60 Hz	Impedance @ 90°C, 60 Hz
mm ²	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.2	15.6	0.142	15.6
1.5*	13.7	17.5	0.142	17.5
2.5	7.56	9.64	0.133	9.64
4.0	4.70	5.99	0.133	5.99
6.0	3.11	3.97	0.126	3.97
10	1.84	2.35	0.118	2.35
16	1.16	1.48	0.112	1.48
25	0.734	0.936	0.107	0.941
35	0.529	0.674	0.104	0.684
50	0.391	0.499	0.103	0.510
70	0.270	0.344	0.102	0.358
95	0.195	0.271	0.099	0.288
120	0.154	0.214	0.097	0.235
150	0.126	0.175	0.097	0.200
185	0.100	0.140	0.097	0.170
240	0.0762	0.108	0.096	0.144
300	0.0607	0.087	0.096	0.129

* Class 5 (30/0.25mm) flexible conductors.

Conductor Short-Circuit Ratings

EPR or MICA/EPR Insulated Cables

Short-Circuit Ratings

Conductor Size mm ²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	0.479	0.214	0.123
2.5	0.799	0.357	0.206
4.0	1.27	0.572	0.330
6.0	1.91	0.858	0.495
10	3.19	1.43	0.825
16	5.11	2.28	1.32
25	7.99	3.57	2.06
35	11.1	5.0	2.88
50	15.9	7.15	4.12
70	22.3	10.0	5.77
95	30.3	13.5	7.84
120	38.3	17.1	9.9
150	47.9	21.4	12.3
185	59.1	26.4	15.2
240	76.7	34.3	19.8
300	95.9	42.9	24.7
400	127	57.2	33.0
500	159	71.5	41.2
630	201	90.0	52.0

N.B: The above ratings assume an adiabatic temperature rise and are based on a conductor temperature of 90°C at start of short-circuit and 250°C at end of shortcircuit.

Installation Guide for Offshore Cables

General Precautions

Cables described in this section should not be installed at temperatures below minus 15°C, nor in any situation where the cooling air temperature exceeds 75°C. The cables meet the IEE requirement concerning impervious sheathing for cables installed on decks, exposed to weather, in damp or wet situations, in machinery compartments and, in general, where water condensation or harmful vapours (including oil vapour) may be present. The sheathing compounds will withstand normal handling, installation and service but in areas where mechanical stress is envisaged unarmoured cables should be fitted in pipes or conduit or trunking. Alternatively, armoured and sheathed cables should be used. Cables should be protected from avoidable risks of mechanical damage and routed away from heat sources such as boilers, hot pipes and resistors. Cable runs should be selected to avoid action from condensed moisture or drips. Cables should not be installed across expansion joints but where this is unavoidable a proportioned loop of cable should be arranged, suitably supported and having an internal radius not less than twelve times its diameter. For services with duplicate supplies, the cables should

follow different paths and be separated as far apart as is reasonably practical. Cables and wiring for mains and emergency power, lighting, internal communications or signalling should be routed away from galleys, machinery spaces and other high fire-risk areas except when supplying equipment in those places. In situations offering considerable risk of mechanical damage, such as storage spaces, cables should be protected by steel casing, trunking or conduit if the structure or attached parts do not afford sufficient protection, even to armoured cables. Any metal casing so used should be sufficiently protected against corrosion. All cable supports and accessories should be robust and constructed from corrosion-resistant material or suitably treated to resist corrosion. Metals or alloys with low melting points (e.g. aluminium) should not be used. Cables passing through watertight decks or bulkheads should be provided with deck-tubes, watertight glands, multi-transit assemblies or fire-retardant packed boxes as appropriate to meet the requirements of the Authority approving the installation.

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Installation Guide for Offshore Cables

General Precautions

Where cables pass through non-watertight bulkheads, beams or other steel structure, the holes should be glanded or bushed with non-corroding materials to prevent damage to both cables and structure. The means of fixing of conductors and terminals should be capable of withstanding the thermal and dynamic effects of short circuits. When single core cables having a current rating greater than 250A need to be installed close to a steel bulkhead the clearance between cable and metal surface should be at least 50mm,

unless the cables belonging to the same a.c. circuit are installed in trefoil. In the interests of safety and circuit reliability it is assumed that installers will adhere to the IEE Regulations and Recommendations for the Electrical Equipment of Ships, and of Mobile and Fixed Offshore installations. Particular attention should be paid to recommendations concerning cables with regard to their effect on navigational and radio equipment.

MINIMUM BENDING RADIUS

Ideally cables should be bent as little as possible and never to radii less than the following:

Type of Cable*	Minimum Bending Radius
Instrumentation	8 x diameter
Power & Control up to 3.3/3.3kV **	
Armoured up to 25mm D	4 x diameter
Armoured over 25mm D	6 x diameter
Unarmoured up to 10mm D	3 x diameter
Unarmoured over 10mm up to 25mm D	4 x diameter
Unarmoured over 25mm D	6 x diameter
Power cable 3.8/6.6kV and above **	
Unscreened	12 x diameter
Screened - single core	20 x diameter
Screened - three core	15 x diameter

* All fire survival (FS) cables - 8 x diameter. ** 4 x diameter Class 2 flexible cables.