

BiTservo[®] CONVERTERS POWER CABLES



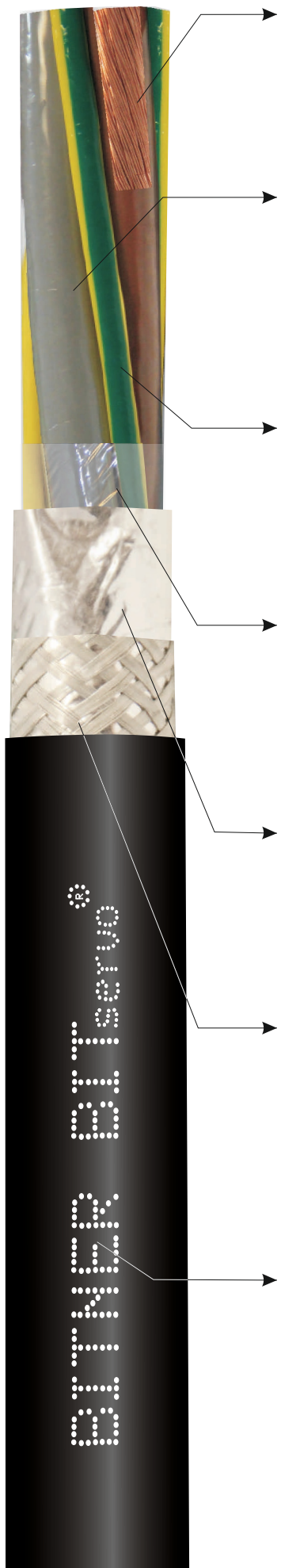
BiTservo[®] cable, which are produced by Cable Factory BITNER Cable are of a unique design. They are used for connecting motors with frequency converters, maintaining full electromagnetic compatibility (EMC) of the connection. PE or XLPE insulation ensures low capacity. BiTservo[®] cables are suitable for permanent installations and for creating movable connections within industrial devices, process lines and machinery operated in dry or wet facilities. For outdoor applications and for laying directly in the ground **BiTservo[®]UV 2YSLCYK-J** and **BiTservo[®]UV 2XSLCYK-J** cables should be used. The cables have a black outer sheath. For public facilities application, we recommend the halogen-free **BiTservo[®] 2YSLCH-J** and **BiTservo[®]2XSLCH-J**.

In order to meet the market expectations, Cable Factory BITNER has developed new cables with improved fire protection characteristics - **BiTservo[®]2XSLCYK-J FR** and halogen-free cables intended for external use and direct laying in the ground - **BiTservo[®]2XSLCHK-J**.

BiTservo[®] cables meet the EMC requirements for the compatibility of an electromagnetic connection. In order to maintain full electromagnetic compatibility, we recommend that you establish direct contact between the copper braid and cable glands.



Every element is important in your application

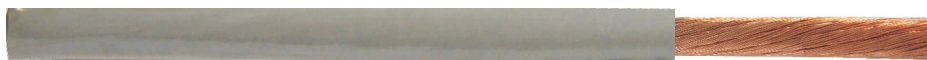


Conductors



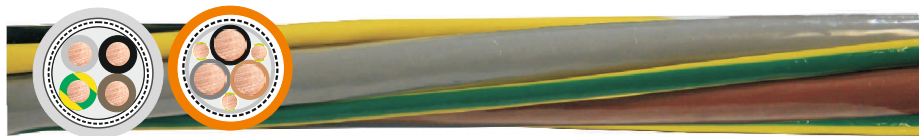
Power conductors of the BiTservo® cables are made of pure copper to make their conductivity as high as possible. Manufactured in accordance with EN 60228 Class 5, IEC 60228 Class 5 and DIN VDE 0295 Class 5. Regardless of the cross-section, the cables have high flexibility. The multi-wire structure of the wires makes them resistant to the vibrations occurring in the industrial environment, and the reduction of the skin effect provides better conductivity of high frequency current.

Insulation



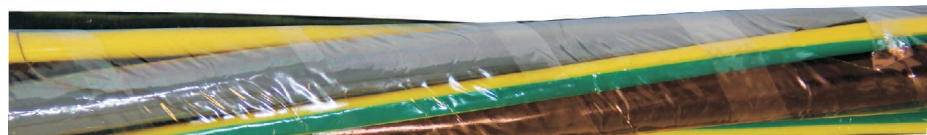
Appropriate insulation is one of the basic conditions for maintaining the right parameters of an electric cable. BiTservo® cables are produced with insulation material of the highest electrical and mechanical parameters. Low dielectric constant guarantees low cable capacity - a desirable feature in converter-motor connections. Cross-linked polyethylene (XLPE) in BiTservo® cables 2XSLCY-J increases the continuous current-carrying capacity at the same time as reducing the costs of the installation.

Core arrangement



In order to broaden the utilisation of the BiTservo® cables, they are manufactured in two versions: asymmetric four-core with a PE conductor having a cross-section equal to the working wire, and symmetrical six-core - providing symmetry of power at a high distance between the converter and motor. Regardless of the version, the core is always twisted with a pitch guaranteeing the flexibility of the cable and easy laying.

Insulating and separating tape



The insulating and separating tape applied directly on the cores improves the electric properties of the cables and increases the electric strength of the core-screen system. The tape facilitates the installation of the cable and can be easily stripped by the installer. It also provides the ability to move the cores in relation to the screen, so that the cable can be more frequently bent in a non-destructive manner. This cable can be used to power mobile and portable devices.

Screen made of ALPET tape



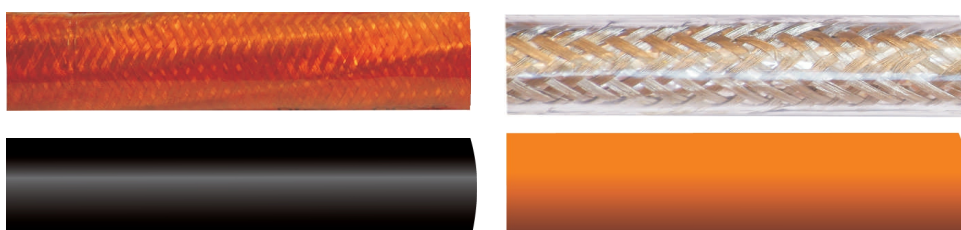
The aluminium backed polyester tape screen is designed to provide 100% coverage of the core arrangement with a screen, which together with the braided screen allows you to make a connection meeting the requirements of electromagnetic compatibility (EMC). The thickness of the foil screen does not reduce the cable's flexibility - despite the 100% coverage of the core with a screen, it still remains shock-resistant.

Copper braid screen



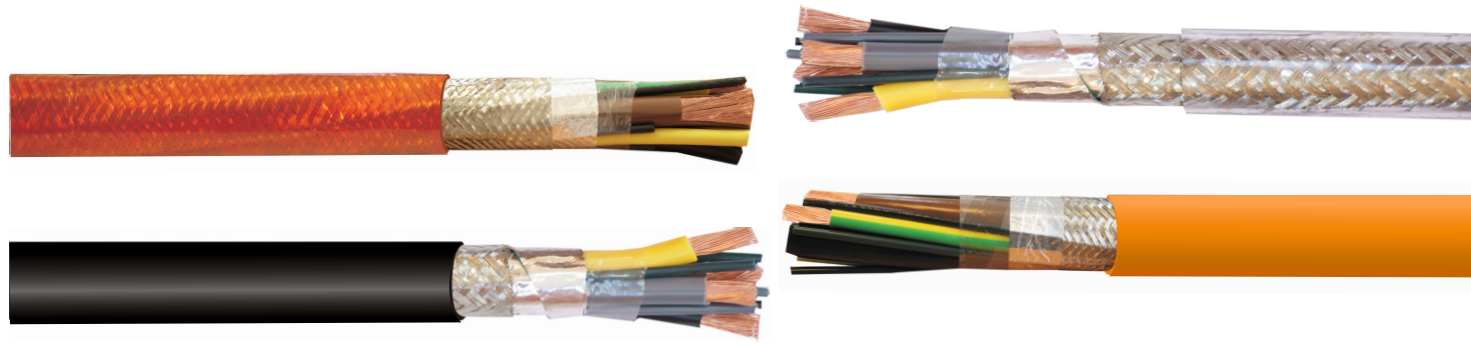
Properly made braided screen together with the foil screen is a precondition for ensuring the electromagnetic compatibility (EMC) in the converter-motor connection. All BiTservo® cables have screens made of tinned copper wires and braided on the foil screen in such a way as to ensure a proper electrical connection and the best possible cooperation of the screens. This combination also makes the screen of the BiTservo® resistant to vibrations and mechanical stresses. The screen maintains continuity even in the most difficult operating conditions.

Outer sheath



The outer sheath is the only element of the cable that has direct contact with the external conditions and, therefore, it is responsible for the environmental resistance of the cable and its mechanical properties. To ensure the correct operation of the BiTservo® cables in various conditions, several versions of coating are provided: transparent PVC coating, black PVC FR (Flame Retardant) coating, orange or black halogen-free coating with increased fire performance. It is also possible to make a custom cable with any environmental resistance according to the exposures specified by the recipient.

BITNER BiTservo® - variety of designs



Transparent PVC sheath on the BiTservo®2YSLCY-J and BiTservo®2XSLCY-J cables for indoor use in industrial conditions, enabling the optical control of the cable screen condition. The cables are self-extinguishing and do not spread flame, according to EN 60332-1.

Black PVC FR allows using BiTservo®2YSLCYK-J FR and BiTservo®2XSLCYK-J FR cables indoor and outdoor and laying them directly in the ground, especially in places with an increased risk of fire. This type of cable is tested for spreading fire along the cable bundle according to EN 60332-3-24. The wide environmental resistance of these cables enables them to be used in most industrial applications.

Halogen-free sheath on the BiTservo®2YSLCH-J and BiTservo®2XSLCH-J cables to be used in public facilities. The cables do not emit toxic corrosive gases (EN 60754) or dense smoke (EN 61034) when on fire. This type of cable is tested for spreading fire along a cable bundle according to EN 60332-3-22 (IEC 60332-3 cat.A). Halogen-free cables with increased environmental resistance BiTservo®2XSLCHK-J are black and were designed for both laying in outdoor installations and directly into the ground.

PROPERTIES - what you need to know before choosing BiTservo®



cables intended for use in industrial conditions, resistant to environmental conditions occurring in most industrial plants



cables for indoor use in dry and damp facilities, inside production workshops and in cable ducts



cables for outdoor use without additional sheaths



cables resistant to UV and weather conditions



cables to be laid directly in dry or wet soil



flame-retardant cables according to EN 60332-1 IEC 60332-1, EN 50265-2



cables with increased fire resistance, not spreading the fire along the cable bundle according to EN 60332-3-24, IEC 60332-3 cat.C, EN 50266-2-4



cable outer sheath made of flame-retardant material with the Oxygen Index above 29. Cables intended for use in areas with an increased risk of fire



flexible cables with wires made of thin copper wires, in accordance with EN 60228 class 5. Screen made of thin copper tinned wires. Cable resistant to vibrations

EMC

cables with braided screen made of copper wires tinned, allowing to maintain electromagnetic compatibility of connections (EMC, EMV)



symmetrical cables ensuring symmetry of voltages used when there is a long distance between the converter and the motor



cables of asymmetrical design, PE wire cross-section equal cross-section of the phase wire



cables resistant to most industrial oils, tested according to EN 60811-2-1. A test resistance can be carried out for any oil delivered by the Customer



halogen-free cables that do not emit corrosive gases when on fire (EN 60754)



cables that do not emit dense smoke when on fire (EN 61034)



fireproof cables with insulation resistance of 180 minutes in fire (EN60331)



fireproof cables, supporting the functions of the cable assembly for 90 minutes (DIN 4102-12)



CPR classification of cables and wires according to the reaction to fire

Kable BiTservo®

											EMC						FE180	E90	CPR
BiTservo® 2YSLCY-J	0,6/1kV	✓	✓				✓			✓	✓		✓						✓
BiTservo® UV 2YSLCYK-J FR	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓						✓
BiTservo® 2YSLCH-J	0,6/1kV	✓	✓				✓			✓	✓		✓	✓	✓				✓
BiTservo® 3plus 2YSLCY-J	0,6/1kV	✓	✓				✓			✓	✓	✓							✓
BiTservo® UV 3plus 2YSLCYK-J FR	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
BiTservo® 3plus 2YSLCH-J	0,6/1kV	✓	✓				✓			✓	✓		✓	✓	✓				✓
BiTservo® 2XSLCY-J	0,6/1kV	✓	✓				✓			✓	✓		✓						✓
BiTservo® UV 2XSLCYK-J FR	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓						✓
BiTservo® 2XSLCH-J	0,6/1kV	✓	✓				✓			✓	✓		✓	✓	✓				✓
BiTservo® UV 2XSLCHK-J	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓				✓
BiTservo® 3plus 2XSLCY-J	0,6/1kV	✓	✓				✓			✓	✓	✓							✓
BiTservo® UV 3plus 2XSLCYK-J FR	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
BiTservo® 3plus 2XSLCH-J	0,6/1kV	✓	✓				✓			✓	✓		✓	✓	✓				✓
BiTservo® UV 3plus 2XSLCHK-J	0,6/1kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓				✓
BiTservo® MV6	3,6/6kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓					✓
BiTservo® MV10	6/10kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓					✓
BiTservo® FS FE180/E90	0,6/1 kV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table of the continuous current-carrying capacity

Cable type	BitServo® 2YSLCY-J BitServo® UV 2YSLCYK-J FR BitServo® 2YSLCH-J BitServo® 3plus 2YSLCY-J BitServo® UV 3plus 2YSLCYK-J FR BitServo® 3plus 2YSLCH-J		BitServo® 2XSLCY-J BitServo® UV 2XSLCYK-J FR BitServo® 2XSLCH-J BitServo® UV 2XSLCHK-J BitServo® 3plus 2XSLCY-J BitServo® UV 3plus 2XSLCYK-J FR BitServo® 3plus 2XSLCH-J BitServo® UV 3plus 2XSLCHK-J	
	Section	continuous current-carrying capacity [A]		continuous current-carrying capacity [A]
		in the air (30°C)	in the ground *	in the air (30°C)
1,5	18	27	23	31
2,5	26	36	32	40
4,0	34	47	42	52
6,0	44	59	53	64
10	61	79	75	86
16	82	102	100	112
25	108	133	133	145
35	135	159	162	174
50	168	188	197	206
75	207	232	250	254
95	250	280	308	305
120	292	318	359	348
150	335	359	412	392
185	382	406	475	444
240	453	473	564	517

*applies to cables intended for laying in the ground

Ground temperature: 20°C
 Thermal resistivity of the ground: 1.0 K * m/W
 Average daily load level: 0.7

Factors correcting the current-carrying capacity of cables suspended in the air

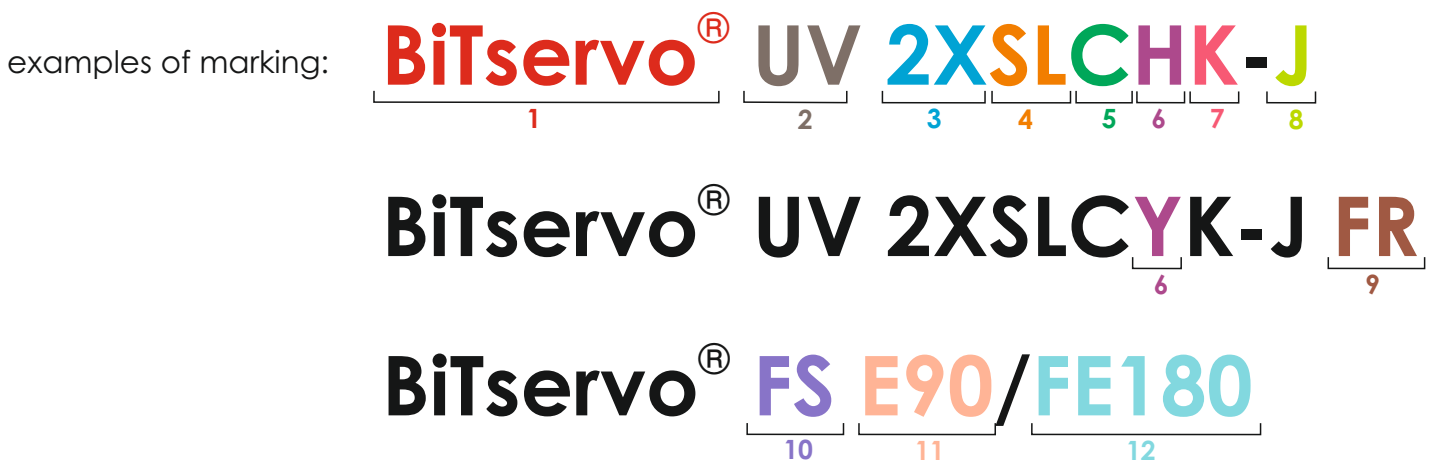
Correction factors for ambient temperature other than 30°C (air)

Ambient temperature °C	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Correction factor	1,18	1,14	1,10	1,05	1,00	0,95	0,89	0,84	0,77	0,71	0,63	0,55	0,45	0,32

Factors correcting the current-carrying capacity of cables laid in the ground

Soil temperature [°C]	Thermal resistivity of the ground [K*m/W]									
	0,70		1,00			1,50			2,50	
	Current-carrying capacity factor									
5	1,24	1,18	1,07	1,11	1,07	1,00	0,99	0,97	0,94	0,89
10	1,23	1,16	1,05	1,09	1,05	0,98	0,97	0,95	0,91	0,86
15	1,21	1,14	1,03	1,07	1,02	0,95	0,95	0,92	0,89	0,84
20	1,19	1,12	1,00	1,05	1,00	0,93	0,92	0,90	0,86	0,81
25	-	-	-	-	0,98	0,90	0,90	0,87	0,84	0,78
30	-	-	-	-	0,95	0,88	0,87	0,84	0,81	0,75
35	-	-	-	-	-	-	-	0,82	0,78	0,72

Marking of converter cables



1	BiTservo[®]	special cables designed for powering the converter
2	UV	cables resistant to UV and weather conditions
3	2Y	polyethylene insulation with reduced capacity
	2X	XLPE insulation with reduced capacity and increased working temperature
4	SL	flexible wires resistant to vibrations, facilitating laying of the cable
5	C	screen
6	Y	PVC outer sheath
	H	halogen-free outer sheath
7	K	black outer sheath for external applications and laying directly in the ground, resistant to UV
8	J	yellow-green wire
9	FR	fire-resistant outer sheath. Cables marked this way have better fire properties, i.e. they do not spread the flame on the cable bundle
10	FS	fireproof cables intended for fire safety installations
11	E90	ensured cable operation in fire for 90 minutes
12	FE180	180 minutes fire resistance
MV6, MV10		medium voltage converter cables

WHAT DISTINGUISHES THE BITNER CABLES...

- ✓ good price
- ✓ available in stock
- ✓ short delivery time
- ✓ a variety of designs tailored to the client's needs
- ✓ possibility of cutting even the shortest sections
- ✓ attention to detail at every stage of the production process

A graphic element with a red and white background, containing the text 'made in Poland' in white lowercase letters.

made in Poland

Cable Factory BITNER Ltd. • 30-009 Kraków, 3/3 Jozefa Friedleina Str. • Production plant:
32-353 Trzyciąż near Kraków • tel.: +48 12 389 40 24 • fax: +48 12 3783792.
web and email: www.bitner.com.pl • bitner@bitner.com.pl