

## LOW-VOLTAGE DC MAIN CABLES

### Copper conductors, XLPE Insulated, HFFR Sheathed, Single-Core Cables, 1.8/3 kV for DC Systems

#### DESCRIPTION:

For indoor or outdoor installation in open air, trough conduit or for direct burial in free draining soil or inside duct where no mechanical damage is to be expected. These cables are suitable for use at the direct current (d.c.) with a maximum permitted operating voltage of 1,800 V between a live conductor and neutral/earth, or 3,000 V between two live conductors.

The maximum permitted operating d.c. voltage of the systems shall not exceed 3.6 kV.

These cables have a temperature rating of 90°C, are UV resistant, low-smoke, halogen-free and flame-retardant as per IEC 60332-3-24 (Category "C").

#### STANDARDS:

1. Conforms to IEC 60502-1 Standard: "*Power cables with extruded insulation and their accessories for rated voltages from 1 kV ( $U_m = 1,2$  kV) up to 30 kV ( $U_m = 36$  kV)*" – "*Part 1: Cables for rated voltages of 1 kV ( $U_m = 1,2$  kV) and 3 kV ( $U_m = 3,6$  kV)*".
2. Conforms to Standard Israeli SI 1516-1 "*Power cables with extruded insulation and their accessories for rated voltages from 1 kV ( $U_m = 1,2$  kV) up to 30 kV ( $U_m = 36$  kV)*" – "*Part 1: Cables for rated voltages of 1 kV ( $U_m = 1,2$  kV) and 3 kV ( $U_m = 3,6$  kV)*".
3. IEC 60332-3-24 Standard: "*Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C*"
4. IEC 60038 Standard: "*IEC Standard Voltages*"
5. Conforms to European Union Regulation (EC) No. 1907/2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (*REACH Regulation*).
6. Conforms to EU Directive No. 2002/95/CE on Restriction on Hazardous Substances, (*RoHS Directive*).

#### CONSTRUCTION:

A Copper compacted circular conductor - class 2 has an extruded cross-linked polyethylene - XLPE red (2) & black (0) insulation applied around the conductor. A black **HFFR (Halogen-free Flame-retardant UV resistant)** outer sheath with printed marking extruded overall.

The **UV/sunlight**- resistance performance of the outer sheath is assessed by using the Arc Xenon test as per *UL1581*.

The cables covered by this specification pass the test for vertical flame propagation (**FR3**) when tested as per *IEC-60332-3-24* Standard.

The cables covered by this specification, are approved for use by Israeli Electric Corp.

#### MARKING:

SYNERGY CABLES N2XH/FR3 UV 1x120 1.8/3.0 kV

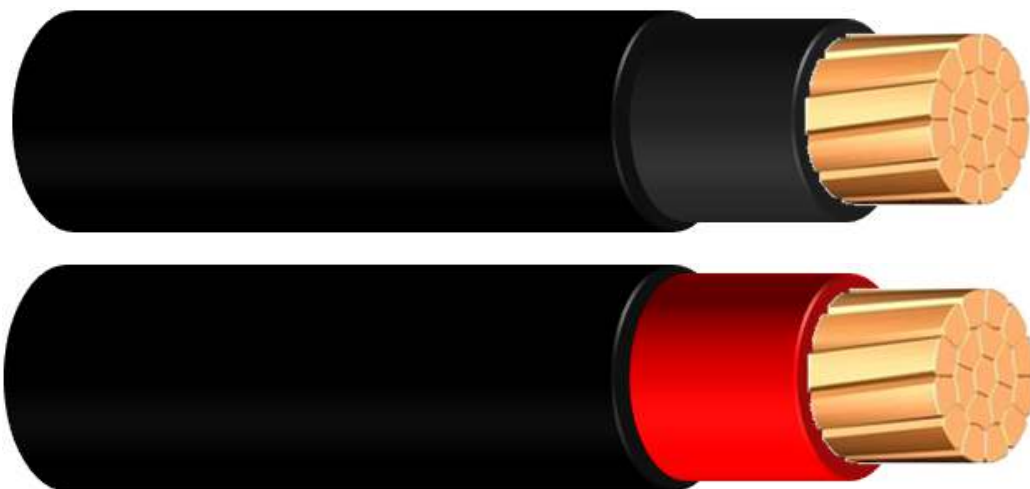
FOR DC SYSTEM ONLY=<running-length in meters><production-year><production-batch-number>= RoHS REACH

#### TESTING:

1. The cables shall withstand when tested as per paragraph 15.3.2. from IEC 60502-1 standard at a DC voltage of 15.5kV.
2. The cables shall pass the vertical-tray flame propagation test as per IEC-60332-3-24 Category "C" (**FR3**)

### Typical Drawings

#### N2XH



## N2XH/FR3 Cables for DC Applications

Copper conductors, XL-HFFR Insulated, HFFR Sheathed, Single-Core Cables,  
 1.8/3.0 kV for DC Systems

Item P/N	Nominal Cross-sectional Area of the conductor [ mm <sup>2</sup> ]	Conductor diameter (nominal) [ mm ]	Overall diameter (approx.) [ mm ]	Minimum bending radius [ mm ]	Conductor DC resistance (20°C) [ Ω/km ]	Short-Circuit rating (1 s) (1) [ kA ]	Current rating - in air (2), (3) [ A ]	Current rating - direct buried (2), (4) [ A ]	Voltage-drop for two-lead system [ V/A/km ]	Completed Cable weight (approx.) [ kg/km ]
<b>181DCR7V1200H</b>	120	13.2	20.5	310	0.153	17.1	420	267	0.390	1,325
<b>181DCR7V1202H</b>	120	13.2	20.5	310	0.153	17.1	420	267		1,325
<b>181DCR7V2400H</b>	240	18.6	26.5	395	0.0754	34.3	652	390	0.192	2,510
<b>181DCR7V2402H</b>	240	18.6	26.5	395	0.0754	34.3	652	390		2,510

- (1) Short circuit rating is based on an initial conductor temperature of 90 °C and a final temperature of 250 °C.  
 (2) Current ratings as per Israel Electrical Code 2014 (Tables 20.6 – for direct burial, 20.8 – for cables in free air)  
 (3) Cable laid in touching-pair formation, in freely circulating air at 35 °C, exposed to direct thermal radiation from the sun;  
 (4) Cable directly buried, in touching-pair formation, at 0.8 m depth in soil at, having an ambient temperature of 30° and a thermal resistivity of 2.5 K\*m/w.

Ambient Temperature °C	15	20	25	30	35	40	45	50	55	60
Correction factor air	1.17	1.13	1.09	1.04	1.00	0.95	0.90	0.85	0.80	0.74
Correction factor ground	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82	0.76	-



Rated voltage  
U<sub>0</sub>/U  
1.8/3 kV



Conductor flexibility  
Stranded  
Cl. 2



Max. conductor temperature in service  
90°C



Minimum bending radius when laying  
15 x D



Lead-free  
YES



Flame-retardant  
IEC 60332-3-24  
(Category "C")

