**Synergy Cables Ltd.**
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# PV DC ARRAY and PV DC MAIN CABLES

## Copper conductors, XLPE Insulated, PVC 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 in:
- unearthed DC Systems having continuous operating voltage between conductors of maximum 3.0 kV;
- single-phase, earthed DC Systems, having an operating voltage between conductors of maximum 1.8 kV

These cables rating of 90ºC, and UV resistant.
These cables are used to connect Combiner Boxes (CBs) to Inverters (INVs).

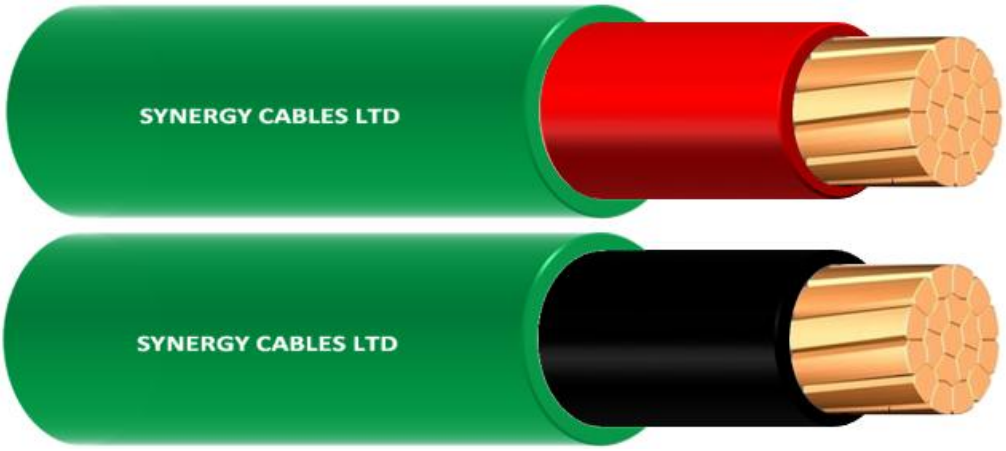
**STANDARDS:**
1. Conforms to IEC 60502-1 Standard: "*Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m$ = 1,2 kV) up to 30 kV ($U_m$ = 36 kV)" – "Part 1: Cables for rated voltages of 1 kV ($U_m$ = 1,2 kV) and 3 kV ($U_m$ = 3,6 kV)"*.
2. Conforms to Standard 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 60332-1 Standard: *"Tests on electrical and optical fiber cable under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – procedure for 1 kW pre-mixed flame"*
4. IEC 60038 Standard: "*IEC Standard Voltages*"
5. IEC 60364-7-712 Standard: "*Electrical Installations of buildings – part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems*".
6. Conforms to European Union Regulation (EC) No. 1907/2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (*REACH Regulation*).
7. 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 green **PVC 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 (**FR1**) when tested as per **IEC-60332-1** standard.
The cables covered by this specification, are approved for use by Israeli Electric Corp.

**MARKING:**
SYNERGY CABLES N2XY FR1 UV 1x<cross-sectional area> 1.8/3.0 kV
FOR DC SYSTEM =<*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 flame propagation test as per IEC-60332-1 ***(FR1)***

## Typical Drawings
## N2XY



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| Item PN | Nominal Cross-sectional Area of the conductor | Conductor diameter (nominal) | Overall diameter (approx.) | Minimum bending radius | Conductor DC resistance (20°C) | Short-Circuit rating (1 s) (1) | Current rating - in air (2),(3) | Current rating - direct buried (2),(4) | Voltage drop for two-lead system | Completed Cable weight (approx.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | [ mm² ] | [ mm ] | [ mm ] | [ mm ] | [ Ω/km ] | [ kA ] | [ A ] | [ A ] | [ V/A/km ] | [kg/km] |
| **181DCR7V0950/2*** | 95 | 11.7 | 20.0 | 300 | 0.193 | 13.6 | 356 | 243 | 0.49 | 1,050 |
| **181DCR7V1500/2*** | 150 | 14.5 | 21.5 | 325 | 0.124 | 21.4 | 422 | 309 | 0.32 | 1,510 |
| **181DCR7V1850/2*** | 185 | 16.3 | 23.5 | 355 | 0.0991 | 26.4 | 553 | 352 | 0.23 | 1,905 |
| **181DCR7V2400/2*** | 240 | 18.6 | 26.5 | 400 | 0.0754 | 34.3 | 660 | 409 | 0.19 | 2,455 |
| **181DCR7V3000/2*** | 300 | 20.9 | 28.5 | 430 | 0.0601 | 42.8 | 671 | 461 | 0.15 | 3,030 |

*** *The last digit means: 0 - black insulation; 2 - red insulation*

*(1)* *Short circuit rating is based on an initial conductor temperature of 90 °C and a final temperature of 250 °C.*

*(2)* *Current ratings calculated by CYME/CYMCAP software*

*(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 Uo/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

UV-Resistant


Flame retardant IEC 60332-1