**Synergy Cables Ltd.**
**Sapirim Industrial Park, 1 Eshel Street**
**P. O. Box 102, Sderot, 8701002, Israel**
**TEL 972-8-6809444, FAX 972-8-6890014**
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# PV DC ARRAY and PV DC MAIN CABLES

## Aluminum conductors, XLPE Insulated, PVC Sheathed Single Core Cables,

## 1.8/3.0(3.6) 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 rating of 90ºC , and UV resistant .
These cables are used to connect Combiner Boxes (CBs) to Inverters (INVs).

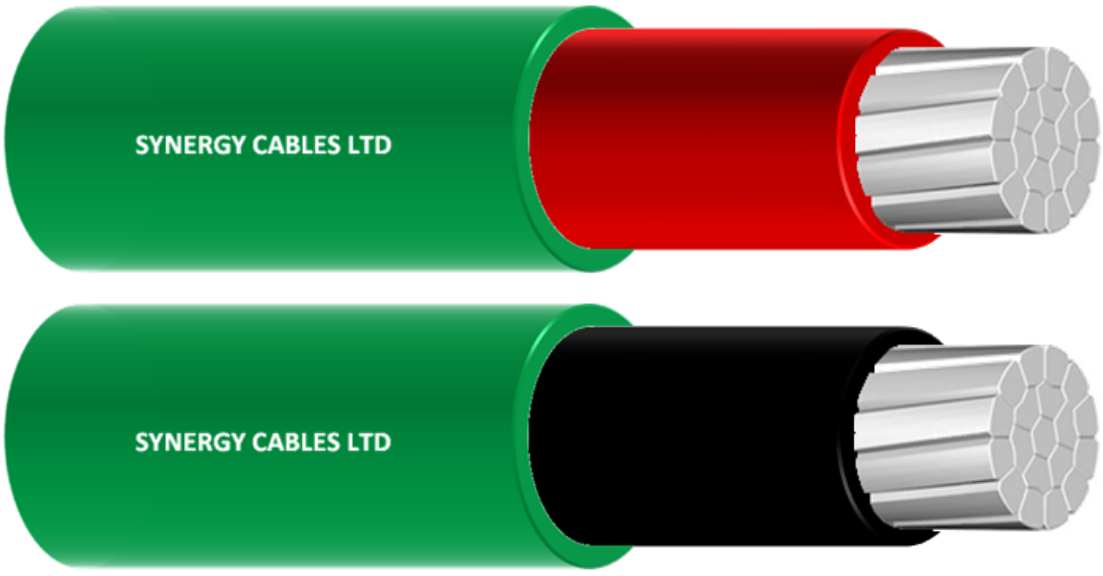
**STANDARDS:**
1. Conforms to IEC 60502-1 Standard: *"Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m$ = 1,2 kV) up to 30 kV ($U_m$ = 36 kV)" – "Part 1: Cables for rated voltages of 1 kV ($U_m$ = 1,2 kV) and 3 kV ($U_m$ = 3,6 kV)"*.
2. IEC 60332-1-2 Standard: *"Tests on electrical and optical fibre 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"*
3. IEC 60038 Standard: "*IEC Standard Voltages*"
4. IEC 60364-7-712 Standard: "*Electrical Installations of buildings – part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems*".
5. Conforms to European Union Reulation (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*).
7. ISO 9001:2015 Certificate I30569

**CONSTRUCTION:**
An aluminum 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 is 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-60332-1-2** standard.
The cables covered by this specification, are approved for use by Israeli Electric Corp.

**MARKING:**
SYNERGY CABLES NA2XY/FR1 UV 1x*<Conductor-Cross-Sectional Area>* MM2 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 spark-tested at a DC or AC voltage as per BS EN 62230:2007 + A1:2014 standard, and **AC** voltage test at **6.5 kV**, or **DC** voltage test at **15.5 kV**, for 5 min.
2. The cables shall pass the flame propagation test as per IEC-60332-1-2 ***(FR1).***

## Typical Drawings
## NA2XY



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## 1.8/3.0 kV for DC Systems

(Continued…)

| 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.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | [ $mm^2$ ] | [ mm ] | [ mm ] | [ mm ] | [ Ω/km ] | [ kA ] | [ A ] | [ A ] | [ V/A/km ] | [kg/km] |
| **338DC0830UV** | *25* | *6.0* | 13.0 | 195 | 1.200 | 2.4 | 116 | 86 | 3.08 | 190 |
| **338DC0832UV** | *25* | *6.0* | 13.0 | 195 | 1.200 | 2.4 | 116 | 86 | 3.08 | 190 |
| **338DC0840UV** | *35* | *7.0* | 14.0 | 210 | 0.868 | 3.3 | 144 | 104 | 2.23 | 240 |
| **338DC0842UV** | *35* | *7.0* | 14.0 | 210 | 0.868 | 3.3 | 144 | 104 | 2.23 | 240 |
| **338DC0850UV** | *50* | *8.3* | 15.5 | 233 | 0.641 | 4.7 | 177 | 123 | 1.64 | 275 |
| **338DC0852UV** | *50* | *8.3* | 15.5 | 233 | 0.641 | 4.7 | 177 | 123 | 1.64 | 275 |
| **338DC0860UV** | *70* | *9.9* | 18.0 | 270 | 0.443 | 6.6 | 228 | 152 | 1.14 | 375 |
| **338DC0862UV** | *70* | *9.9* | 18.0 | 270 | 0.443 | 6.6 | 228 | 152 | 1.14 | 375 |
| **338DC0870UV** | *95* | *11.7* | 19.5 | 293 | 0.320 | 9.0 | 277 | 179 | 0.82 | 475 |
| **338DC0872UV** | *95* | *11.7* | 19.5 | 293 | 0.320 | 9.0 | 277 | 179 | 0.82 | 475 |
| **338DC0920UV** | *120* | *13.2* | 21.0 | 315 | 0.253 | 11.3 | 324 | 205 | 0.65 | 540 |
| **338DC0922UV** | *120* | *13.2* | 21.0 | 315 | 0.253 | 11.3 | 324 | 205 | 0.65 | 540 |
| **338DC0930UV** | *150* | *14.5* | 22.0 | 330 | 0.206 | 14.2 | 373 | 232 | 0.53 | 630 |
| **338DC0932UV** | *150* | *14.5* | 22.0 | 330 | 0.206 | 14.2 | 373 | 232 | 0.53 | 630 |
| **338DC0940UV** | *185* | *16.3* | 24.0 | 360 | 0.164 | 17.5 | 429 | 259 | 0.42 | 750 |
| **338DC0942UV** | *185* | *16.3* | 24.0 | 360 | 0.164 | 17.5 | 429 | 259 | 0.42 | 750 |
| **338DC0950UV** | *240* | *18.6* | 27.0 | 405 | 0.125 | 22.7 | 509 | 299 | 0.32 | 970 |
| **338DC0952UV** | *240* | *18.6* | 27.0 | 405 | 0.125 | 22.7 | 509 | 299 | 0.32 | 970 |

*(1) Short circuit rating is based on an initial conductor temperature of 90 °C and a final temperature of 250 °C.*
*(2) Current rating conforming to Israel electrical Code (**קובץ תקנות חשמל**)*
*(3) Current rating as per table **90.8**, for single-phase system, from Israel electrical Code (**קובץ תקנות חשמל**);*
*In free air, ambient temperature = 35°C.*
*The calculations were done supposing **shaded cables (no direct sun radiation)***
*(4) Current rating as per table **90.6**, for single-phase system, from Israel electrical Code (**קובץ תקנות חשמל**);*
*Direct buried, ambient temperature of the soil = 30°C, thermal resistivity of the soil = 2.5 K*m/w.*

| Ambient Temperature °C | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** | **65** |
|---|---|---|---|---|---|---|---|---|---|---|
| Correction factor air | 1.13 | 1.09 | 1.04 | 1.00 | 0.95 | 0.90 | 0.85 | 0.80 | 0.74 | 0.67 |
| Correction factor ground | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 | 0.76 | 0.71 | 0.65 |

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## 1.8/3.0 kV for DC Systems

(Continued…)

| 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.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | [ $mm^2$ ] | [ mm ] | [ mm ] | [ mm ] | [ Ω/km ] | [ kA ] | [ A ] | [ A ] | [ V/A/km ] | [kg/km] |
| **338DC13000UV** | 300 | 20.9 | 29.0 | 435 | 0.100 | 28.4 | 588 | 339 | 0.26 | 1,150 |
| **338DC13002UV** | 300 | 20.9 | 29.0 | 435 | 0.100 | 28.4 | 588 | 339 | 0.26 | 1,150 |
| **338DC14000UV** | 400 | 24.0 | 32.5 | 488 | 0.078 | 37.8 | 710 | 410 | 0.20 | 1,455 |
| **338DC14002UV** | 400 | 24.0 | 32.5 | 488 | 0.078 | 37.8 | 710 | 410 | 0.20 | 1,455 |
| **338DC15000UV** | 500 | 26.8 | 36.0 | 540 | 0.061 | 47.3 | 822 | 470 | 0.16 | 1,810 |
| **338DC15002UV** | 500 | 26.8 | 36.0 | 540 | 0.061 | 47.3 | 822 | 470 | 0.16 | 1,810 |
| **338DC16300UV** | 630 | 31.0 | 41.0 | 615 | 0.0469 | 59.6 | 956 | 544 | 0.12 | 2,315 |
| **338DC16302UV** | 630 | 31.0 | 41.0 | 615 | 0.0469 | 59.6 | 956 | 544 | 0.12 | 2,315 |

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

*(2) Current rating conforming to Israel electrical Code (**קובץ תקנות חשמל**)*

*(3) Current rating as per table **90.8**, for single-phase system, from Israel electrical Code (**קובץ תקנות חשמל**);*
*In free air, ambient temperature = 35°C.*
*The calculations were done supposing **shaded cables (no direct sun radiation)***

*(4) Current rating as per table 90.6, for single-phase system, from Israel electrical Code (**קובץ תקנות חשמל**);*
*Direct buried, at 0.8m depth, ambient temperature of the soil = 30°C, thermal resistivity of the soil = 2.5 K*m/w*

| Ambient Temperature °C | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** | **65** |
|---|---|---|---|---|---|---|---|---|---|---|
| Correction factor air | 1.13 | 1.09 | 1.04 | 1.00 | 0.95 | 0.90 | 0.85 | 0.80 | 0.74 | 0.67 |
| Correction factor ground | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 | 0.76 | 0.71 | 0.65 |