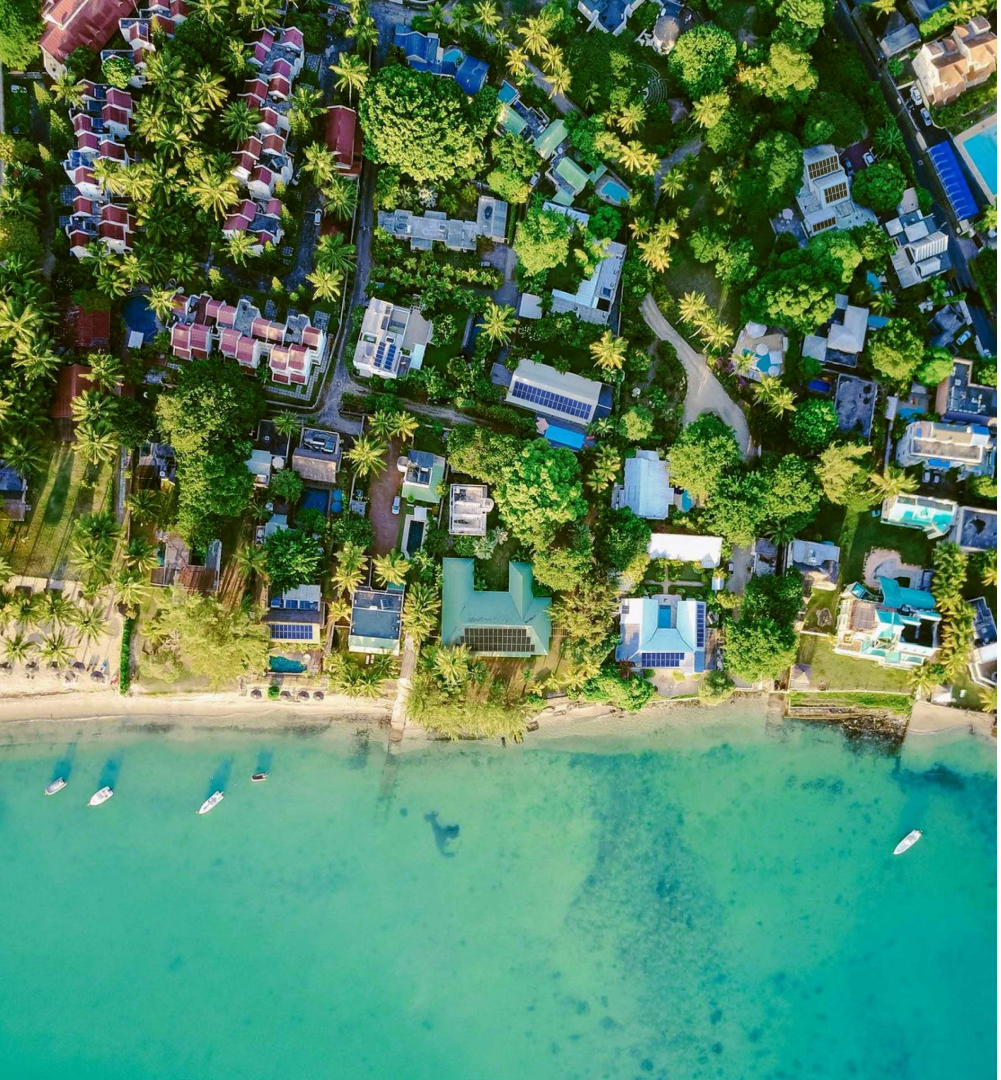


SolarAPP+ Contractor Input Training: Appendix of Input Examples relating to CCCs

Current Carrying Conductors (CCC) Overview: Microinverters

Solar APP+

All Inverters

1. The adjacent table includes the input for the number of AC current carrying conductors and DC current carrying conductors based on the inverter brand manufacturer and the expected system design.
2. It is possible that your system would not follow these expected designs. If so, be prepared to defend the selection with the SolarAPP+ team and likely the inspector out in the field.

Inverter MFG	DC CCC (per series string)	AC CCC (per branch)
ABB	2	3
Delta Electronics	2	3
Enphase Energy Inc.		2
LG Electronics Inc.		2
SMA America	2	3
SolarEdge Technologies Ltd.	2	3
Tesla Inc.	2	2

Current Carrying Conductors (CCC) Overview: Microinverters

Microinverters

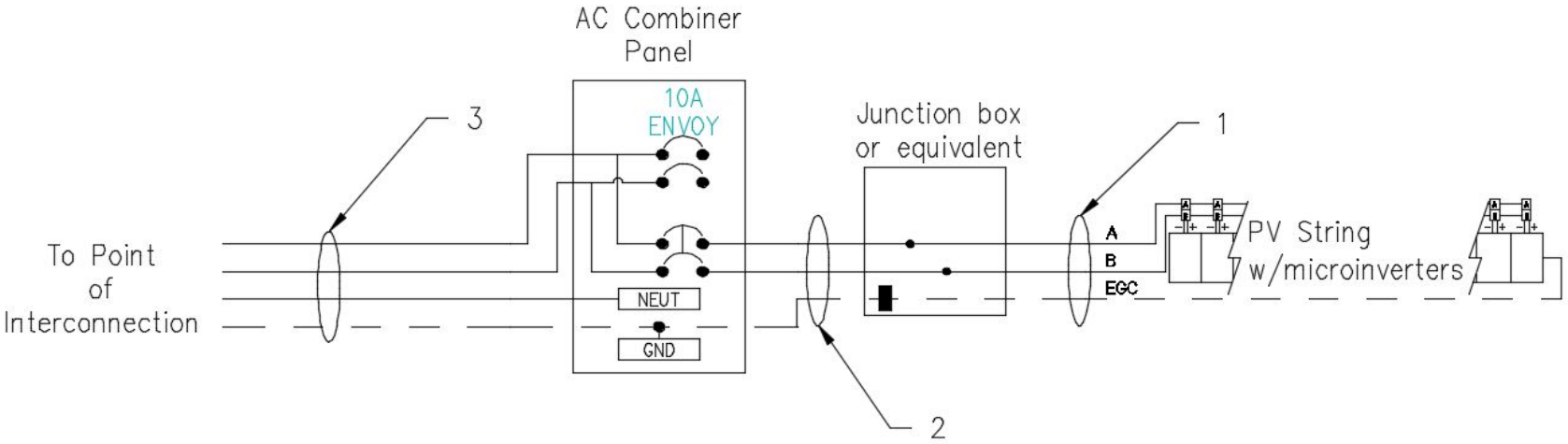
For Enphase, AC current carrying conductors (CCC) refers to the AC output conductors of microinverter branch circuits. The SolarAPP+ is using this value to calculate conduit and wire size.

- Each branch circuit will have (2) CCC. This value will increase with each subsequent branch circuit of microinverters. A system with 2 branches of microinverters will have (4) CCC.
- The output of the combiner box to the point of interconnection will have (3) CCC by default in SolarAPP+.

See the following examples of Enphase microinverters and related CCCs.

Current Carrying Conductors (CCC) Overview: Microinverters

Microinverters: Example 1



Wire call outs and respective CCC

1= 2 CCC

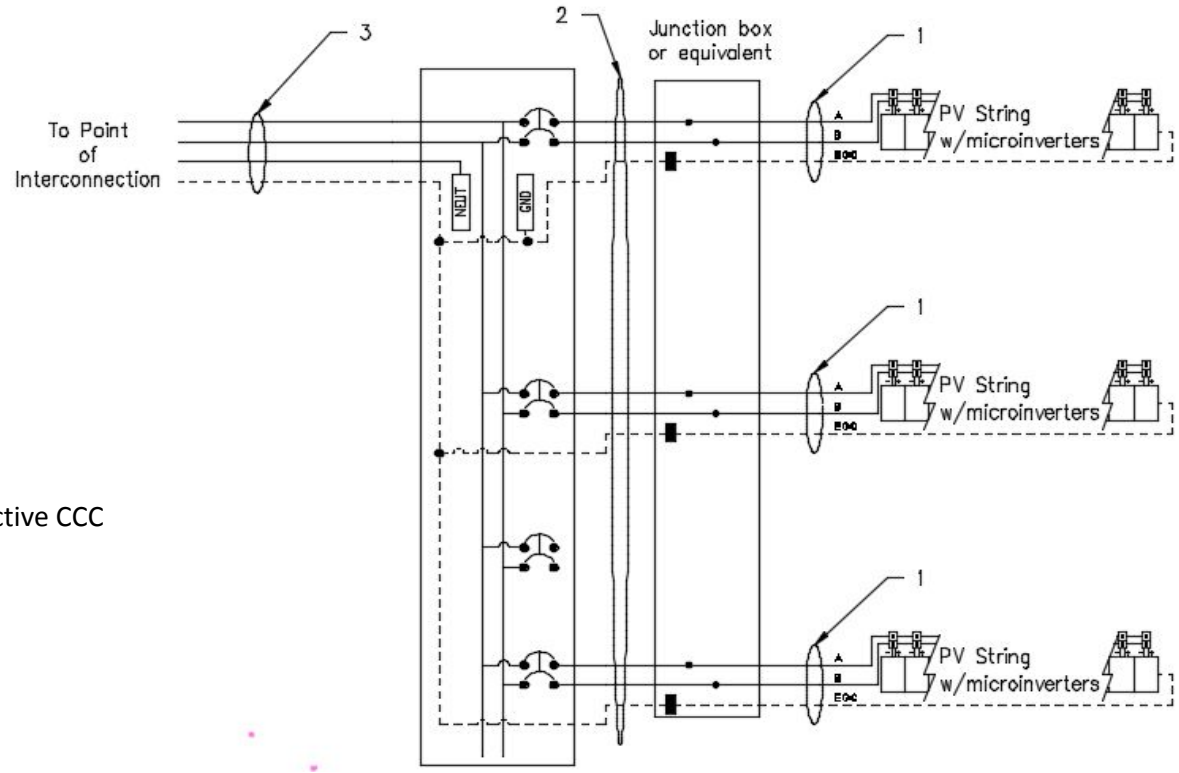
2= 2 CCC

3= 3 CCC

EGC not a CCC

Current Carrying Conductors (CCC) Overview: Microinverters

Microinverters: Example 2



Wire call outs and respective CCC

1= 2 CCC

2= 6 CCC

3= 3 CCC

EGC not a CCC

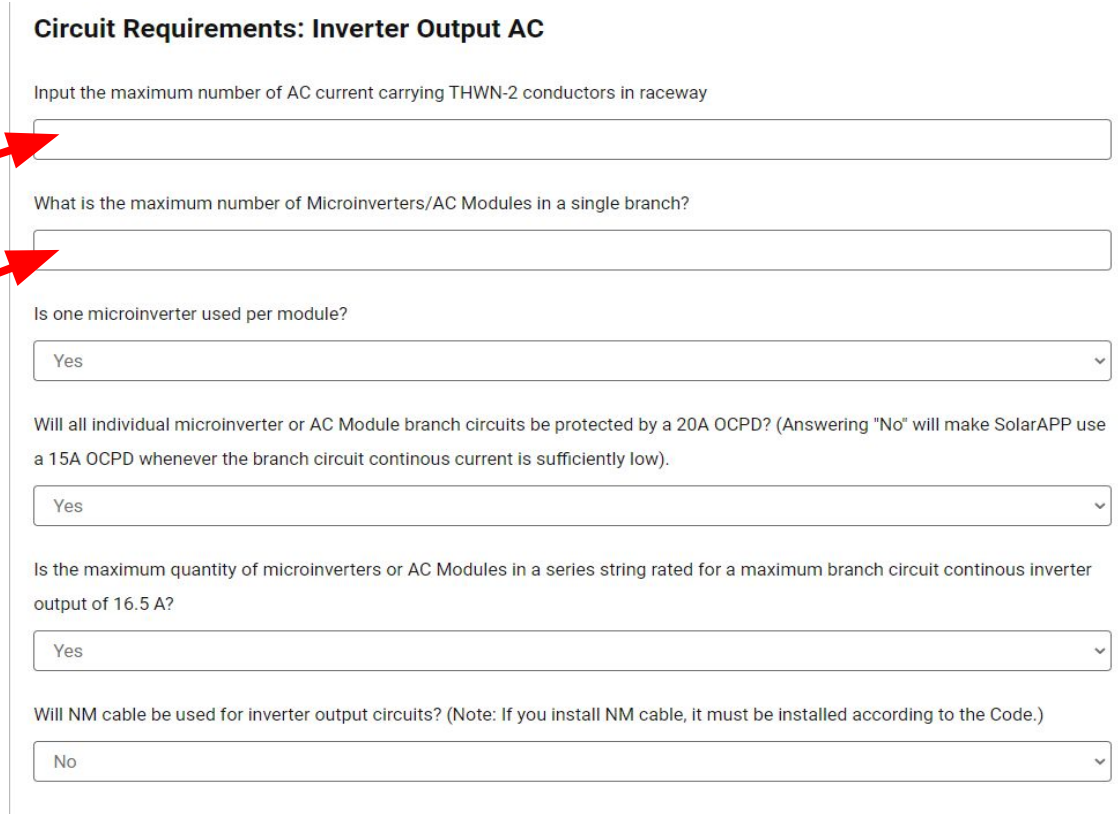
Current Carrying Conductors (CCC) Overview: Microinverters

Solar APP+

Microinverters: Inputs

Max number of AC CCC in raceway, a function of how many branch strings are on the roof x 2

Max number of micro/AC modules in a branch = Branch of (x) (largest series branch)



Current Carrying Conductors (CCC) Overview: Microinverters

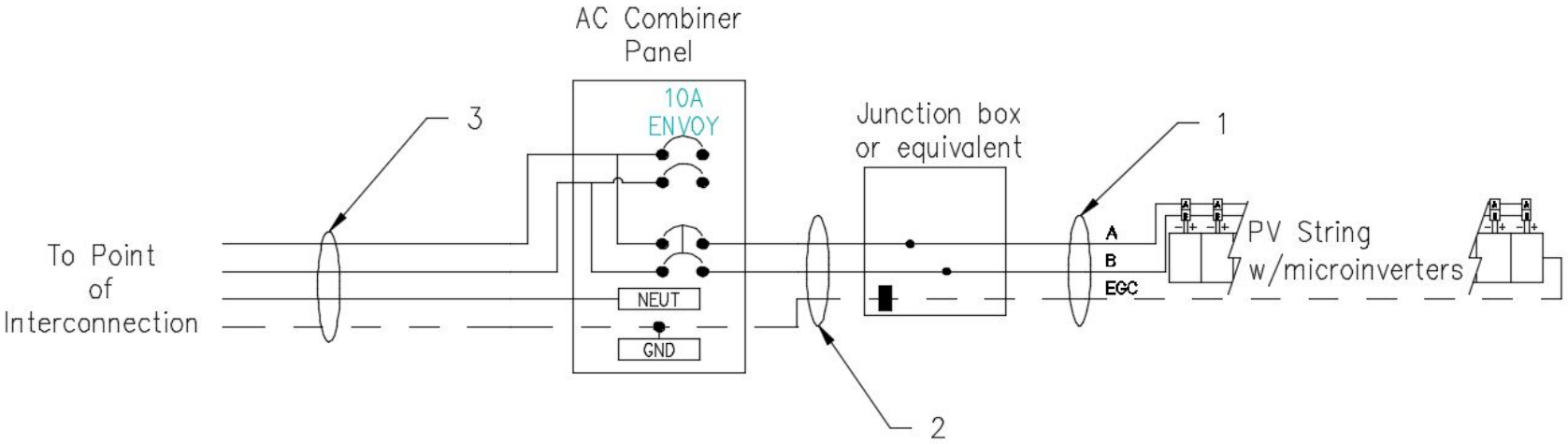
String Inverter w/DC

For Solaredge, DC current carrying conductors (CCC) refers to the DC output conductors of series string.

- Each series string will have (2) CCC.
- A system with parallel strings (2 series strings combined in parallel) will have (2) CCC.
- If using a junction box or equivalent: transition from PV wire to THWN
- The output of the AC combiner box to the point of interconnection will have (3) CCC by default in SolarAPP+.

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 1



Wire call outs and respective CCC

1= 2 CCC

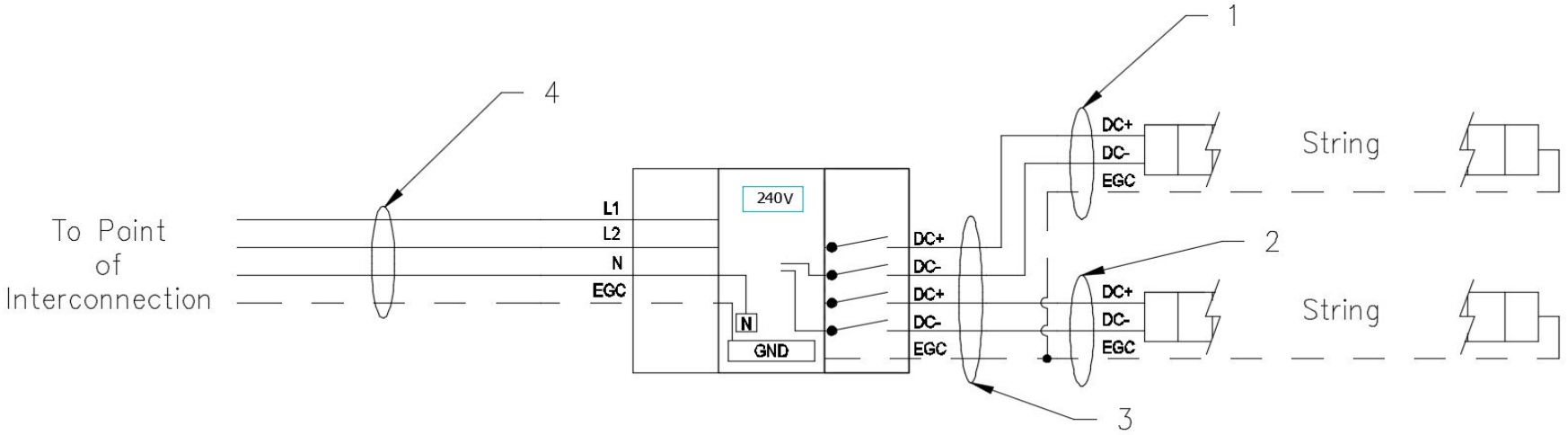
2= 2 CCC

3= 3 CCC

EGC not a CCC

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 2



Wire call outs and respective CCC

1= 2 CCC

2= 2 CCC

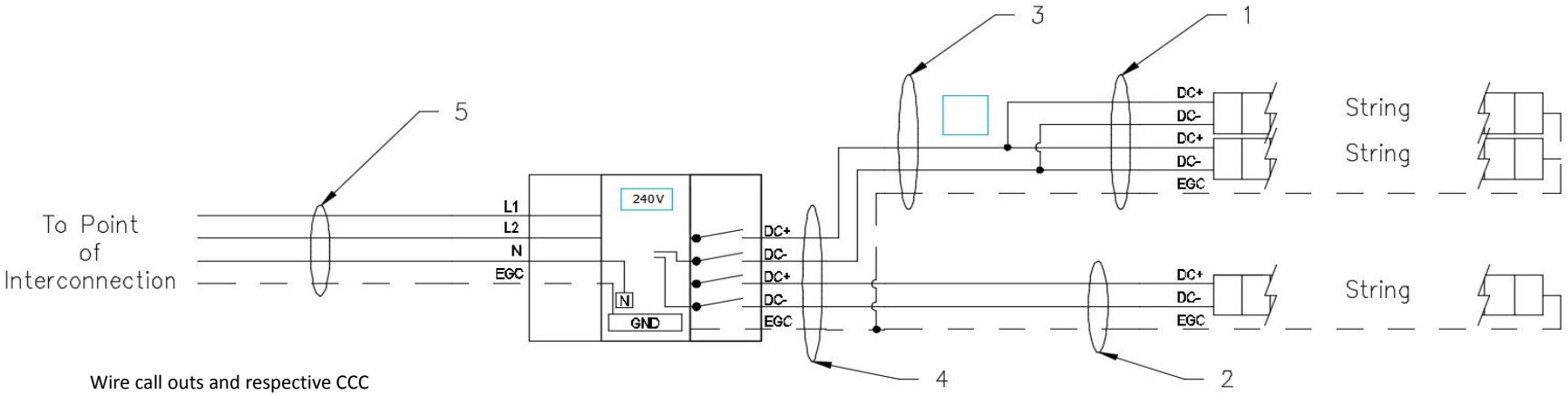
3= 4 CCC

4= 3 CCC

EGC not a CCC

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 3



Wire call outs and respective CCC

1= 4 CCC

2= 2 CCC

3= 2 CCC

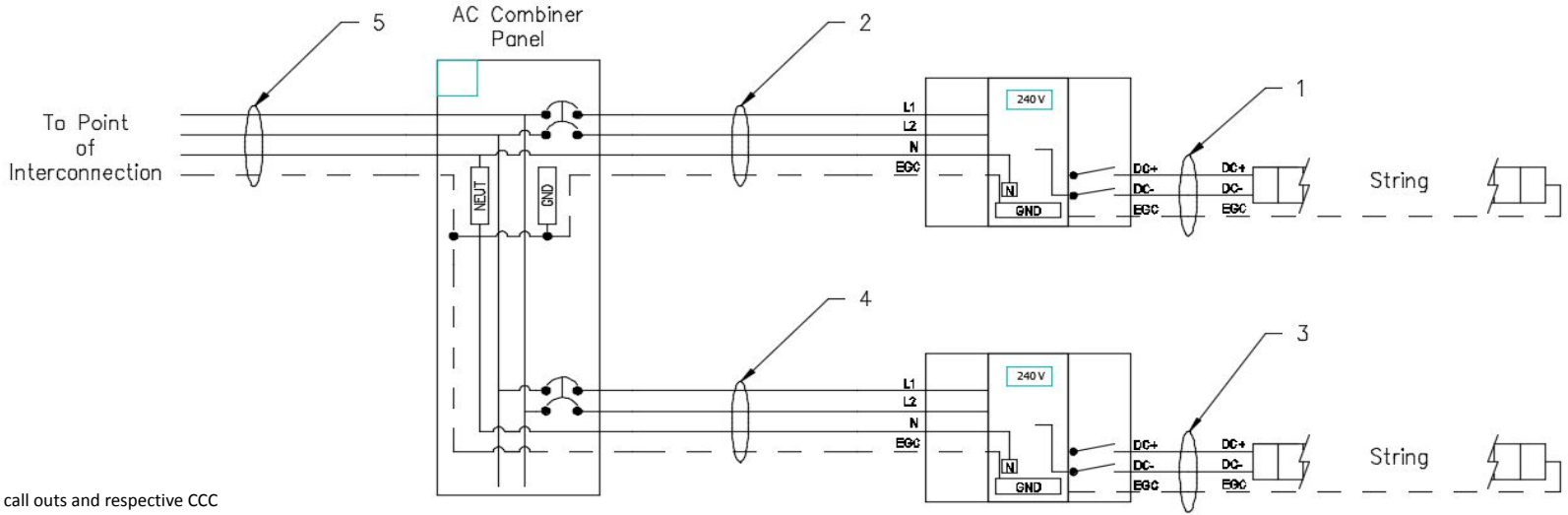
4= 4 CCC

5= 3 CCC

EGC not a CCC

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 4



Wire call outs and respective CCC

1= 2 CCC

2= 3 CCC

3= 2 CCC

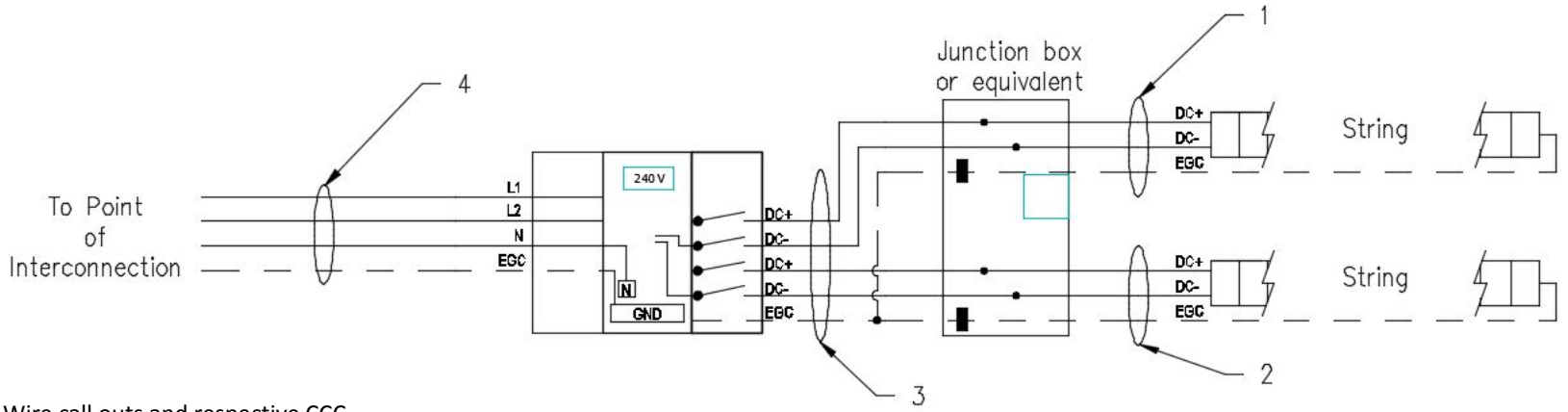
4= 3 CCC

5= SolarAPP+ will automatically default to 3 CCC

EGC not a CCC

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 5



Wire call outs and respective CCC

1= 2 CCC

2= 2 CCC

3= 4 CCC

4= 3 CCC

At junction box PV wire transitions to THWN

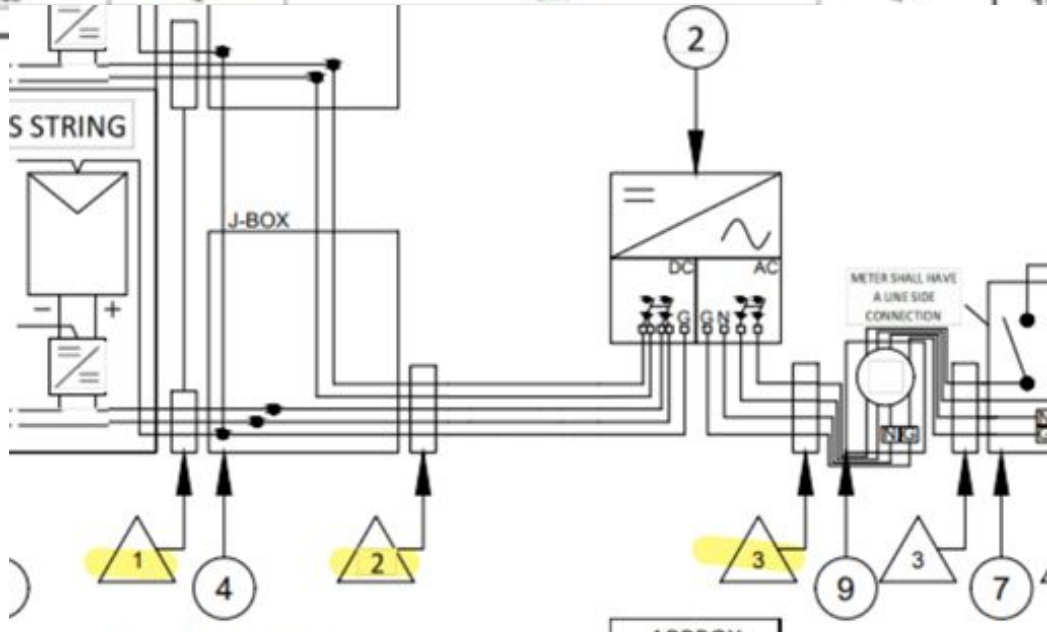
EGC not a CCC

Current Carrying Conductors (CCC) Overview: String Inverter w/DC

String Inverter w/DC: Example 6

CONDUIT AND CONDUCTOR SCHEDULE (PER NEC 690.8(B), TABLE 310.15(B)(2)(a), TABLE 250.122)

TAG	CONDUCTOR TYPE	CONDUCTOR SIZE	# OF CONDUCTORS	CONDUIT TYPE	MIN. CONDUIT SIZE
1	OPTIMIZER CABLE	#10	2	IN FREE AIR	N/A
	BARE COPPER (EGC)	#6	1	IN FREE AIR	
2	THWN-2	#10	4	MC THROUGH ATTIC WHERE POSSIBLE, OTHERWISE EMT RUN ON ROOF	3/4"
	THWN-2 / EGC	#10	1	MC THROUGH ATTIC WHERE POSSIBLE, OTHERWISE EMT RUN ON ROOF	
3	THWN-2	#8	3	EMT	3/4"
	THWN-2 / EGC	#10	1	EMT	



There are (0) PV wire in raceway, (4) THWN-2 DC conductor in raceway, and (3) THWN-2 AC conductor in raceway.

Current Carrying Conductors (CCC) Overview: Microinverters

Solar APP+

String Inverters w/DC-DC Converters: Inputs

Circuit Requirements: Inverter Input DC

Max number of DC CCC in raceway PV wire

Input the maximum number of DC current carrying PV wire or USE-2 conductors in raceway

Max number of DC CCC in raceway THWN wire

Input the maximum number of DC current carrying THWN-2 conductors in raceway

If 2 series strings combined in parallel = Yes

Are any series strings combined in parallel, with a maximum of 2 strings in parallel?

Max number in a series string = Branch of (x) (largest series string)

What is the maximum quantity of modules in a DC series string?

Does the quantity of series connected DC-DC coverters exceed the manufacturers instructions to ensure a maximum string voltage of less than 600V?

No