



SolarAPP+ Contractor Input Training (All Jobs)

SolarAPP+: Login



SolarAPP+

URL: <https://solarapp.nrel.gov/>

Username: email

Password: password



[Login](#) - [Register](#)

Sign In to your SolarAPP Account

Don't have an account? [Register for SolarAPP](#)

Your Email

Password

Remember Me

[Forgot Your Password?](#)

Are you Eligible?

To complete your first project you must provide the following to solarapp@nrel.gov.

- State license number and expiration date for participating local government (link to state licensing board is acceptable)
- City business license and expiration date for participating local government (pocket card required)

If SolarAPP+ is not active in a local government in your service territory the system cannot be used to pull a permit in that community.

Prepare Materials

Have the following materials ready for reference:

- Plans with exact model numbers of equipment that will be used.
- Specification Sheets (uploaded in portrait mode for proper upload and visibility of content)
- Internal Project related data/documents
- Payment method

Click the [New Project] button to start.



Mark Rodriguez ▾

NOTICE: This application is currently in TESTING and CANNOT be used to obtain any permits. In order to obtain a permit, you must work with the relevant authority for your jurisdiction.

Projects

New Project

All

Approved

Draft

Filter projects...

Projects

- List of created projects
- **Show:** See approval docs and payment history
- **Edit:** Make changes to a submission
- **Final Project:** Lock the design to further edits
- **Archive Project:** Delete the project

Projects

Mark Rodriguez ▾

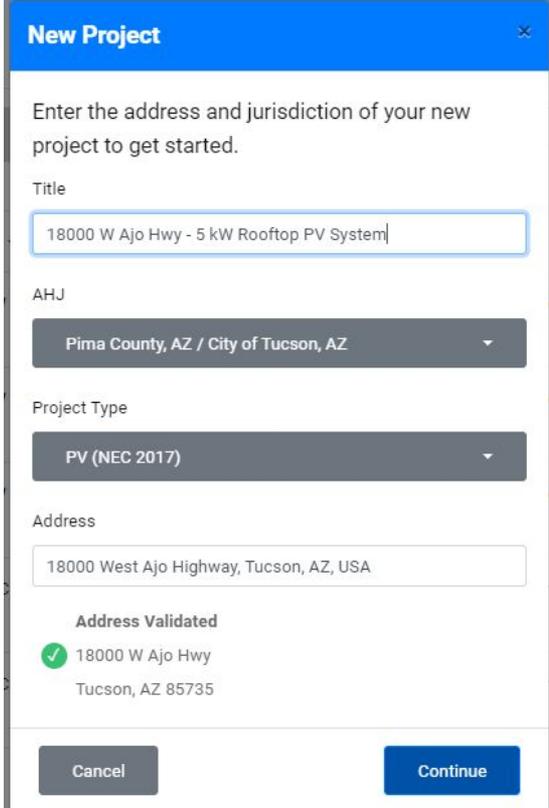
New Project

All	Approved	Draft	Filter projects...		
Title ▾	Address ▾	Jurisdiction ▾	Status ▾	Approval ID ▾	
501R-577WILL	577 Alton Way Denver, CO 80230	City and County of Denver	Approved PV	SA20210316-105-2-9	⋮
New Project 2021-03-10 21:25:03	3423 Soyla Dr Oceanside, CA 92058	SME AHJ	Draft PV+ST	N/A	⋮ Show Edit Final Project Archive Project
New Project 2021-03-10 17:19:18	3423 Soyla Dr Oceanside, CA 92058	SME AHJ	Draft PV+ST	N/A	⋮
New Project 2021-03-09 00:54:57	3423 Soyla Dr Oceanside, CA 92058	Oceanside	Draft PV	N/A	⋮
Microinverter conduit test	3423 Soyla Dr Oceanside, CA 92058	Oceanside	Draft PV	N/A	⋮

← 1 2 3 4 →

Create the Project

- Title = Job Code or however you wish to title the project, note this title will show up on approval documents
- Project Type = select the project type from the dropdown most commonly: rooftop solar also known as PV NEC 2017
- AHJ = Jurisdiction
- Address = Paste or enter in Project Address and choose to validate from drop down.
- Note: If address is not validated, check to confirm the address is in the AHJ you selected.
 - If it is in the AHJ selected, confirm the project is not new construction, or substantially close to being new construction (< 6 months since close of sale).



New Project ✕

Enter the address and jurisdiction of your new project to get started.

Title

AHJ

Project Type

Address

Address Validated
✓ 18000 W Ajo Hwy
Tucson, AZ 85735

Scope of Work and Project Eligibility

- Scope of Work = Copy Scope of Work from PV-1.0
 - **Detail the following as needed:**
 - · PV kW DC system size (always required)
 - · Main panel upgrade size (if applicable)
 - · Main breaker derate (if applicable) and calculated residential load for the home on the main panel per NEC 220.83.
- City License Info = Select from the list
- State License Info = Select from the list
- Review the Eligibility checklist to ensure the submitted project qualifies for SolarAPP+
- Check the “All work shall comply...” checkbox, verifying compliance to NEC 2017 and 2018 IRC.

SolarAPP Eligibility

Project Information

Scope of Work

Test

Review

I hereby affirm that I reviewed SolarAPP eligibility and am submitting a system in compliance with the limitations therein stated.

Will all work comply with the 2017 National Electrical Code® (NFPA 70), and the 2018 International Residential Code (IRC), UL Standards, Manufacturer’s instructions, and Municipal requirements.

License Information

City License

Please contact AHJ to add city licenses. ▼

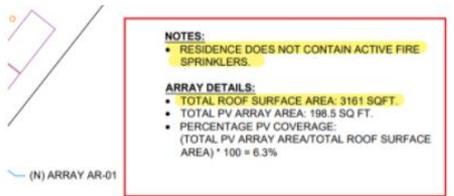
State License

C10 - Test1234 (issued: 12-01-2020) ▼

SCOPE OF WORK	GENE
<ul style="list-style-type: none"> SYSTEM SIZE: 3465W DC, 2640W AC MODULES: (11) LONGI GREEN ENERGY TECHNOLOGY CO LTD: LR6-60HPH-315M INVERTER(S): (11) ENPHASE ENERGY: IQ7-60-2-US RACKING: SNAPNRACK RLU; RL UNIVERSAL, SPEEDSEAL TRACK ON COMP, SEE DETAIL SNR-DC-00436 	<ul style="list-style-type: none"> ALL WC ALL MAN PHOTO ELECTF PHOTO SOLIDLY MODUL INVERT

Fire Page

- Review the SolarAPP+ Fire Bulletin to ensure the submitted project qualifies for SolarAPP+
- In-dwelling automatic sprinklers = confirm in design documents, as this may be listed in notes of the plan.
 - This influences whether there are 18 inch or 3 ft setbacks based on the array's area and coverage of the roof.
- Roof Area = Confirm in design document, as this may be noted in an array details section as seen below.



115R-107ADKE

107 Elderwood Dr Pleasant Hill, CA 94523

SolarAPP Standard Fire Permit

Standard Fire Permit.

Fire Terms

I hereby affirm that I will comply with all requirements and guidelines as set out by the SolarAPP Fire Bulletin

Does the home have sprinkler systems?

No

What is the home's total roof area in square feet?

3161

Structural Page

1. Weight = must be lower than 4 lbs per sq foot and check design plans to confirm.
2. Will attachment spacing be stacked or staggered? See configuration.
3. On center attachment spacing, specify in inches.

SolarAPP Standard Structural Permit

Structural Information

What is the weight of the PV system in lbs/sq ft?

4 1

Will attachment points of the mounting system be staggered?

Yes 2 ▾

What is the proposed maximum spacing in inches between adjacent attachment points of the mounting system?

72 3

ROOF INFO			FRAMING INFO			ATTACHMENT INFORMATION					DESIGN CRITERIA	
Name	Type	Height	Type	Max Spacing	OC Spacing	Detail	Max Landscape OC Spacing	Max Landscape Overhang	Max Portrait OC Spacing	Max Portrait Overhang	Configuration	MAX DISTRIBUTED LOAD: 3 PSF SNOW LOAD: 0 PSF
AR-01	COMP SHINGLE - RLU	1-Story	2X8 RAFTERS	11' - 0"	24"	RL UNIVERSAL, SPEEDSEAL TRACK ON COMP, SEE DETAIL SNR-DC-00436	6' - 0"	1' - 6"	4' - 0"	1' - 0"	STACKED	WIND SPEED: 32 MPH 3-SEC GUST. S.S. LAG SCREWS: 3/16" 2.5" MIN EMBEDMENT STRUCTURAL NOTES: • INSTALLERS TO VERIFY RAFTER SIZE, SPACING AND SLOPED SPANS, AND NOTIFY E.O.R. OF ANY

D1 - AR-01 - SCALE: 3/16" = 1'-0"
PITCH: 22°
AZIM: 39°

3

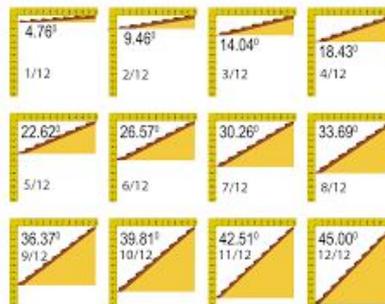
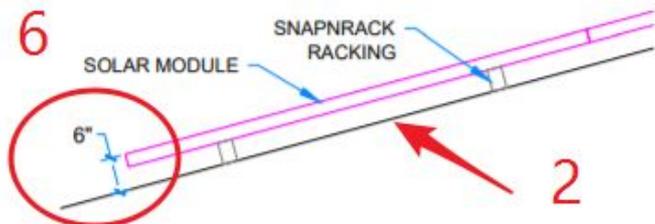
2

1

Structural Page

1. Number of unique mounting planes, each roof will have its own section for the following info
2. Flush mount or Tilt up racking = See detail
3. See array info for roof type by array = Type
4. Conditional based on roof covering type = Composite shingle and must be < 2
5. Convert pitch from degrees to Rise-over-run
6. Module height above the roof surface = See elevation detail

MODULE ELEVATION DETAIL - SCALE: NTS



How many roof surfaces at different slopes and/or orientations will be used for installation? (Enter 1 if all roofs used have the same orientation.)

2 1

Is this a flush mount (parallel to roof) or 'tilt up' system?

Flush mount: 2

Roof Plane 1

What is the current roof covering material?

Asphalt or composition shingles 3

How many layers of composite shingle are currently present?

1 layer 4

What is the pitch of the roof surface?

4/12 5

What is the maximum height of the module above the roof surface? (Distance from module backsheet to roof)

4 inches 6

Roof Plane 2 *Only if more than 1 roof plane

What is the current roof covering material?

Clay and concrete tile

What is the pitch of the roof surface?

5/12

What is the maximum height of the module above the roof surface? (Distance from module backsheet to roof)

6 inches

ROOF INFO			FRAMING INFO			ATTACHMENT INFORMATION					DESIGN CRITERIA	
Name	Type	Height	Type	Max Span	OC Spacing	Detail	Max Landscape OC Spacing	Max Landscape Overhang	Max Portrait OC Spacing	Max Portrait Overhang	Configuration	MAX DISTRIBUTED LOAD: 3 PSF SNOW LOAD: 0 PSF WIND SPEED: 92 MPH 3-SEC GUST. S.S. LAG SCREWS: 5/16": 2.5" MIN EMBEDMENT STRUCTURAL NOTES: • INSTALLERS TO VERIFY RAFTER SIZE, SPACING AND SLOPE BRIMS AND NOTES
AR-01	COMP SHINGLE - RLU	1-Story	2X8 RAFTERS	11' - 3"	24"	RL UNIVERSAL, SPEEDSEAL TRACK ON COMP, SEE DETAIL SNR-DC-00436	6' - 0"	1' - 6"	4' - 0"	1' - 0"	STACKED	
D1 - AR-01 - SCALE: 3/16" = 1'-0" PITCH: 22° AZIM: 39°												

2

5

Structural Page Con't

1. Does the roof structure appear structurally sound...? = Yes
2. Module and mounting designed to withstand expected loads? = Yes

Does the roof structure appear to be structurally sound, without signs of alterations or significant structural deterioration or sagging?

Yes

1

Is the solar module and mounting system rated by the manufacturer to withstand the upward force of the local wind speed 95 MPH and evenly distribute load into the supporting structure?

(validated through the UL 1703 or 61730 module rating for mechanical load rating, and UL 2703 mounting system mechanical load rating)

Yes

2

Any red flag structural issues will be called out by design at the customer huddle. Structural upgrades may be performed during installation. The answer to this question must be “YES” to be compatible with SolarAPP+.

The Solar module and mounting system will be qualified by the manufacturer and supported through the racking system. The datasheet uploaded for the racking system will have the list of approved modules.

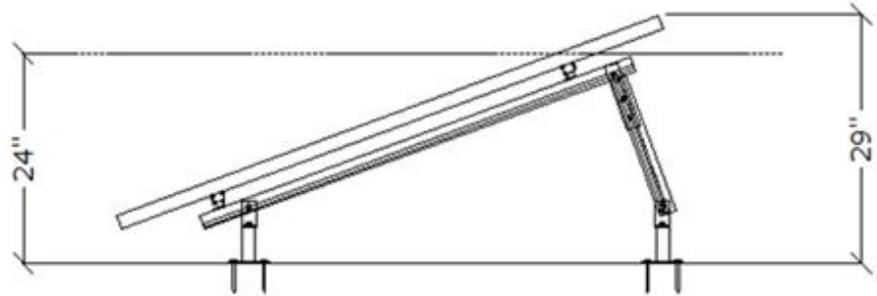
Structural Page Notes - Tilt Up System

For Tilt up systems, at least 20% of the module must have height less than 24 inches off the roof surface.

The code allows the reduction of live load to zero in areas where the PV array is less than 24 inches from the roof surface.

As long as at least 20% of the array area is less than 24" from the roof surface, we can calculate that the total dead + live load on the roof is equivalent before and after the addition of the PV to the roof, and therefore meets section 403/503 of the IEBC.

As a result, the module to the right would qualify as eligible in SolarAPP+, even though some of the module's height exceeds 24 inches.



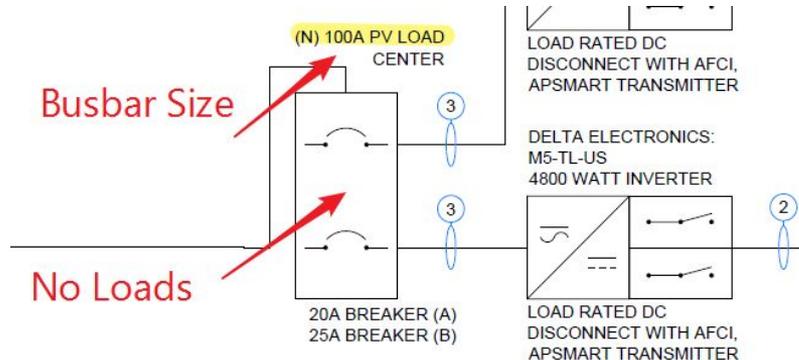


SolarAPP+ Contractor Input Training - Electrical (String w/o DC)

Electrical Page

Without DC-DC converters i.e. Delta M, Solaredge HD wave

1. Datasheet = upload or pre-populate from drop down (after first submission), Select the appropriate model number.
2. Manufacturer = Select from the dropdown list
3. Select the inverter model number
 - o This question is accessing a database of approved equipment based on the manufacturer selection. Model numbers are required to match exactly.
4. Architecture type = String inverter without DC-DC converters
5. 2nd inverter = See scope of work and/or refer to electrical diagram. If yes, provide similar information to that of inverter 1, in addition add the busbar size of PV combiner panel based on details of design.
6. Datasheet, upload or pre-populate from drop down (after first submission).
7. Manufacturer
8. Model
9. All inverter outputs must have the same point of interconnection = Yes
10. Combiner panel = YES if 2nd inverter AND PV Combiner panel on plans
11. Busbar size of Combiner panel = See detail on design, diagram, or plan.



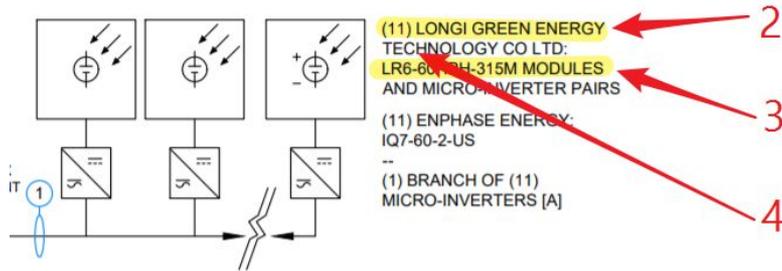
SolarAPP Standard Electrical Permit

Equipment: Inverters	
Datasheet for Inverter 1 [90.7; 110.3(C); R106.1]	
1617923304364-I9-[Datasheet] Delta E- Storage.pdf	1
Inverter 1 Manufacturer	
Delta Electronics	2
Inverter 1 Model Number (NOTE: For AC Modules, enter the AC Module Model number here.)	
E4-TL-US [240V]	3
Architecture type used for all inverters in this project	
String Inverter without DC-DC Converters	4
Do you have a 2nd Inverter?	
Yes	5
Datasheet for Inverter 2 [90.7; 110.3(C); R106.1]	
1606942306647-I68-[Datasheet] Delta M - PV Only.pdf	6
Inverter 2 Manufacturer	
Delta Electronics	7
Inverter 2 Model Number	
E6-TL-US [240V]	8
Will all power production inverter outputs have the same point of connection?	
No	9
Will inverter outputs be combined in a dedicated PV only combiner panel with no loads? (Note - only three current carrying conductors are allowed in the raceway for the output of the inverter combiner panel)	
Yes	10
Busbar size of PV inverter only combiner panel	
200	11

Electrical Page

Modules

1. Datasheet = pre-populate from drop down (after first submission) or upload, Select the appropriate model number.
2. Manufacturer = Select from the dropdown list
3. Select the inverter model number
 - o This question is accessing a database of approved equipment based on the manufacturer selection. Model numbers are required to match exactly.
4. Module Quantity can be gleaned from the single line diagram or the scope of work.



Equipment: Modules

Datasheet for Module 1 [90.7 ; 110.3(C) ; R106.1]

1607633542851-I12-[Datasheet] LONGI LR6-60HPB 300-320W.pdf

1

Module 1 Manufacturer

LONGI Green Energy Technology Co., Ltd.

2

Module 1 Model Number (NOTE: For AC Modules, enter the DC modules model number.)

LR6-60HPH-315M

3

Module 1 Quantity

11

4

Electrical Page

Racking/Flashing

1. Datasheet = pre-populate from drop down (after first submission) or upload, Select the appropriate model number.
2. Manufacturer = see detail on design or **SnapNRack** here.
3. Model Number = **See detail on design data sheet for exact model.**
4. Combination of racking and modules listed to UL 2703 = **Yes, confirm via datasheet.**
5. Fire Classification = **Yes**
6. Flashing = **See detail on design data sheet**
7. Datasheet = pre-populate from drop down (after first submission) or upload, Select the appropriate model number.
8. Flashing installed per MFG instruction = **Yes.**

INFO			ATTACHMENT INFORMATION		
Max Span	OC Spacing	Detail	Max Landscape OC Spacing	Max Landscape Overhang	
11' - 3"	24"	RL UNIVERSAL, SPEEDSEAL TRACK ON COMP, SEE DETAIL SNR-DC-00436	6' - 0"	1' - 6"	

Equipment: Racking/Flashing

Datasheet for Racking System 1 [90.7 ; 110.3(C) ; R106.1] (Ensure your datasheet has the list of approved modules to 2703 for grounding and bonding)

1607635534241-115-SnapNRack_Universal RL_SpeedTrack (1).pdf 1

Racking System 1 Manufacturer

SnapNRack 2

Racking System 1 Model Number

RLU 3

Is Racking System 1 UL 2703 listed for grounding and bonding with the PV module models specified in this SolarAPP project? [90.7 ; 110.3(C) ; 690.43(A)]

Yes 4

Will the combination of modules and racking system have the same fire classification as the roof assembly? R324.4.2

Yes 5

Name of Flashing to be Used

Speedseal 6

Datasheet for Flashing: See attached.

1607633605583-1116-SNAPNRACK, TDS, ULTRA RAIL SPEEDSEAL FOOT_07.07.20.pdf 7

Do you agree to install the flashing per the manufacturer's instructions for the means of accomplishing weather proofing?

Yes 8

SolarAPP+: Racking/Flashing

Electrical Page

Racking/Flashing

1. To specify fire classification for the combination of racking system and modules to UL 2703 the contractor is required to upload the installation manual that clearly lists the approved modules that match the SolarAPP submission.
2. For a SolarAPP project employing the RL Universal Racking system with Longi LR4-60HPH-360M modules, the contractor would upload a copy of the Racking system installation manual containing the specific model numbers for the installed module as shown here..

SnapRack™

Solar Mounting Solutions

RL Universal

Railless Residential Roof Mount System
Installation Manual

snaprack.com

Appendix A

APPROVED MODULE INFORMATION

The following modules have completed the [UL 2703 Listing process for bonding and fire classification](#) and have been approved for use with the RL Universal mounting system by the module manufacturer. Module manufacturer approval letters can be found at www.snaprack.com.

RL Universal has been evaluated for Bonding of the following UL/NRTL Listed PV modules to UL 2703 requirements:

Manufacturer	Model	Wattage
Longi	LR6-60-XXXM	270-300
	LR6-60BK-XXXM	270-300
	LR6-60HV-XXXM	270-300
	LR6-60PB-XXXM	280-320
	LR6-60PE-XXXM	280-320
	LR6-60PH-XXXM	280-320
	LR6-60HIB-XXXM	295-320
	LR6-60HPB-XXXM	295-320
	LR6-60HIH-XXXM	300-330
	LR6-60HPP-XXXM	300-320
	LR4-60HIB-XXXM	335-365
	LR4-60HPB-XXXM	335-365
	LR4-60HIH-XXXM	350-380
	LR4-60HPH-XXXM	350-380
	LR4-60HPP-XXXM	350-380
	LR4-60HPP-XXXM	350-380

SolarAPP+: Racking/Flashing (Continued)

Electrical Pa

UL Product iQ™

QIMS.E485228 - Mounting Systems, Mounting Devices, Clamping Devices and Ground Lugs for Use with Photovoltaic Modules and Panels

Mounting Systems, Mounting Devices, Clamping Devices and Ground Lugs for Use with Photovoltaic Modules and Panels

[See General Information for Mounting Systems, Mounting Devices, Clamping Devices and Ground Lugs for Use with Photovoltaic Modules and Panels](#)

GAF
1 CAMPUS DR
PARSIPPANY, NJ 07054 USA

E485228

Racking/Flashing

1. The contractor could also collect this information directly from a NRTL and their product information page, which verifies the 2703 certification of the mounting system with a specific module for bonding, grounding, mechanical loading, and system fire classification.
2. Here we show an example using GAF's DecoTech RI 2000 mounting system and an example module: Solaria PowerXT-325R-BX / 330R-PX.

Cat. No.	Investigated for Bonding	Investigated for Mechanical Loading	System Fire Classification (A, B or C)	Tested in Combination With
Photovoltaic mounting system				
DecoTech RI 2000	Y	Y	See Below	NRTL listed UL 1703 laminates 1. Solar World "Sunmodule Plus 270-300 mono black laminate" 2. Solar World "Sunmodule Protect 270-300 mono black laminate" 3. "Stion "STL models" 4. Solaria PowerXT "PowerXT-325R-BX 330R-PX" 5. Silfab Solar "SLA-M300 M310"
DecoTech RI 2000	See Above	See Above	A	Any listed fire performance type 3 modules. And NRTL listed UL 1703 laminates: Solar World "Sunmodule Plus 270-300 mono black laminate" Solaria PowerXT "PowerXT-325R-BX 330R-PX" Silfab Solar "SLA-M300 M310"
GAF Energy Solar System	Y	Y	See Below	NRTL Certified, Solaria PowerXT "PowerXT-360R-PD-L"
GAF Energy Solar System	See Above	See Above	A	NRTL Certified, Solaria PowerXT "PowerXT-360R-PD-L"

Electrical Page

Rapid Shutdown: Know your tech!

1. RSD listed to UL 1741 = **Yes**. Find this info on the datasheet for DC-DC converters rapid shut down (RSD)/middle circuit interrupter (MCI)
2. *Outside array boundary* RSD listed to UL 1741 = **Yes**. Find this info on the datasheet for module-level power electronics (MLPE)
3. Manufacturer = See detail on design and data sheet such as **APS**
4. Model Number = **OPT-XXX** or **RSD-S-PLC**
5. Datasheet for outside the array boundary. For these systems, RSD devices perform **BOTH the outside and inside the array boundary functions**. Upload or select the appropriate datasheet based on manufacturer and model number.
6. Method of compliance = select 690.12(b)(2)(1) OR Controlled conductors per 690.12(B)(2)(2) where applicable.
7. Datasheet for RSD device = Upload or select the same datasheet as above based on MFG and model number.
8. Manufacturer = See details on design data sheet such as **Delta**
9. Model Number = See details on design data sheet such as **OPT-300** or **RSD-S-PLC**
10. *Inside array boundary* RSD listed to UL 1741 = **Yes**. Find this info on the datasheet for DC-DC converters (Optimizers) or module-level power electronics (MLPE)

For DC String inverter (i.e. Delta, Fronius, or SMA) = Yes

Equipment: Rapid Shutdown	
Is Rapid Shutdown Device UL 1741 Listed? [90.7 ; 110.3(C) ; 690.4(B) 690.12(D)]	1
Rapid Shutdown Device Manufacturer for Outside the Array Boundary	2
Rapid Shutdown Device Model Number for Outside the Array Boundary	3
Datasheet for Rapid Shutdown Device Outside the Array Boundary [90.7 ; 110.3(C) ; R106.1]	4
Method of Rapid Shutdown Compliance Inside Array	5
Datasheet for Rapid Shutdown Device [90.7 ; 110.3(C) ; R106.1]	6
Rapid Shutdown Device Manufacturer for Inside the Array	7
Rapid Shutdown Device Model Number for Inside the Array	8
Is Rapid Shutdown Device UL 1741 Listed? [90.7 ; 110.3(C) ; 690.4(B) 690.12(D)]	9

Electrical Page

Installation details is about the materials we use for install, except...

1. Existing PV systems and energy storage NOT allowed

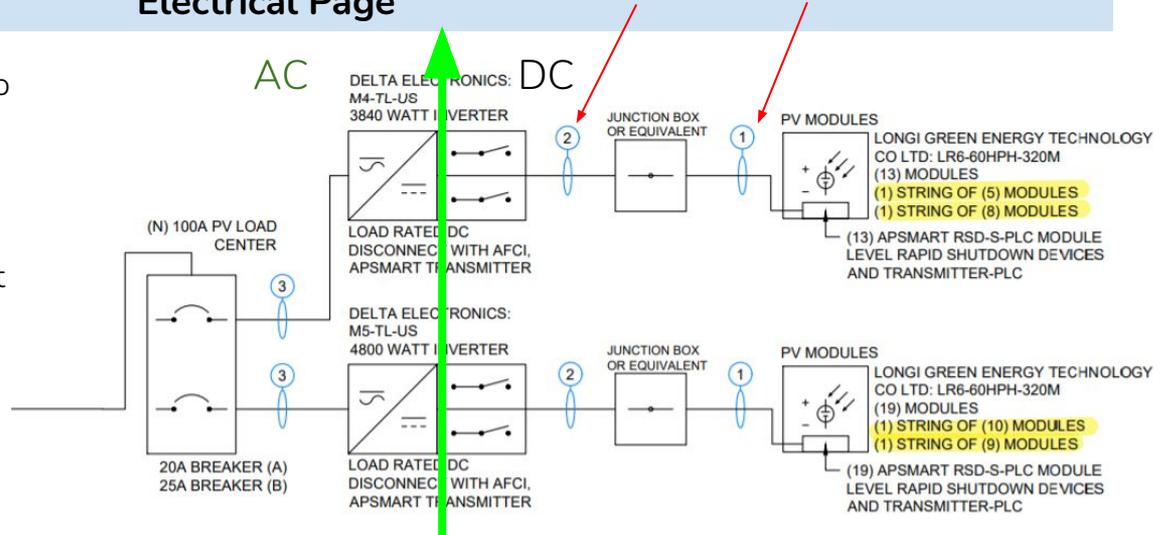
- 2. Conductor type = **Yes**
- 3. Rooftop Conduit height = **Yes**
- 4. PV wire or Use-2 = **Yes**
- 5. Pv wire diameter = **Yes**
- 6. Terminal rating = **Yes**
- 7. Grounding conductor = **Yes**
- 8. Voltage and current spec within range of connected equipment? = **Yes**

The Installation Details section sets the minimum requirements for installation materials that inform SolarAPP+ code compliance checks. The contractor MUST adhere to these requirements at installation in order to maintain SolarAPP+ eligibility. Diameter, height, and rating contribute to the calculations used for conductor size, conduit fill, and conductor ampacity derating.

Installation Details	
Is there an existing Utility interactive power production source connected to the home's electric service?	No 1
Are DC and AC conductors copper, Class B or Class C, and THWN-2, NM, USE-2, PV Wire, or jacketed multiconductor cable assembly listed and identified for the application? [690.8(B); 310.15(A) and (B)]	Yes 2
Are all rooftop conduits mounted at least 7/8" above the roof surface?	Yes 3
Are all PV Source Circuit conductors in free air listed as PV Wire or USE-2?	Yes 4
Does the PV Wire have a maximum outer diameter of 0.24" (6.1 mm)?	Yes 5
Are all power terminals rated to 75°C or greater, labeled for use with Copper Class B or Class C wires, and accept minimum 8 AWG wire?	Yes 6
Where Equipment Grounding Conductors (EGC) are not routed with circuit conductors, will EGC either be minimum 6 AWG or protected from physical damage? [250.120(C)]	Yes 7
Do module voltage and current specifications fall within allowable range of connected equipment?	Yes 8

Electrical Page

DC current carrying conductors (CCC) refers to the DC source circuit conductors from the array to the inverter. Each branch circuit will have (2) CCC. The SolarAPP+ is using this value to calculate conduit and DC wire size. This value will increase with each subsequent branch circuit of modules. A circuit with 2 branches of modules will have (4) CCC. AC CCC refers to the inverter output circuits and per the example, each inverter has (3) CCC in a single raceway. The output of the PV load center is always assumed to have (3) CCC.



DC Current Carrying Conductors

CONDUIT SCHEDULE				
#	CONDUIT	CONDUCTOR	NEUTRAL	GROUND
1	NONE	(4) 10 AWG PV WIRE	NONE	(1) 10 AWG BARE COPPER
2	1" EMT OR EQUIV.	(4) 10 AWG THHN/THWN-2	NONE	(1) 10 AWG THHN/THWN-2
3	3/4" EMT OR EQUIV.	(2) 10 AWG THHN/THWN-2	(1) 10 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
4	3/4" EMT OR EQUIV.	(2) 8 AWG THHN/THWN-2	(1) 10 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2

DC

AC

Electrical Page

For “Without DC-DC converters” (aka Delta E/M)

1. Max number of DC Current carrying conductors (CCC) PV wire in raceway = enter 2 per the number of circuits, from roof to ground, in the same raceway, one 10AWG THWN-2 EGC is used for conduit fill calculations. See conduit schedule.
2. Max number of DC CCC THWN wire in raceway = Enter 0 for PV wire used from array to inverter directly or (2) per number of circuits from roof to ground contained in a single raceway. See conduit schedule.
3. Are any series strings combined in parallel? Enter “No” or “Yes” depending if you choose to combine strings in parallel on the roof to reduce the amount of wires in the raceway
4. Max number of modules in a branch = **String of (X) modules.**

Circuit Requirements: Inverter Input DC

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

0 1

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

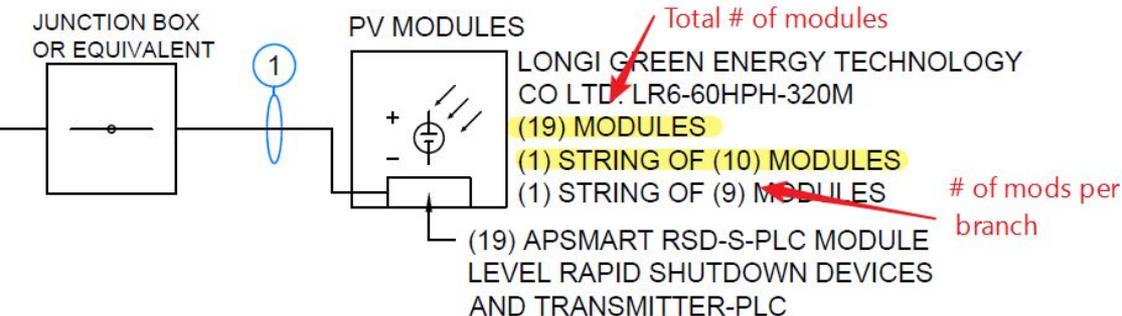
4 2

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

No 3

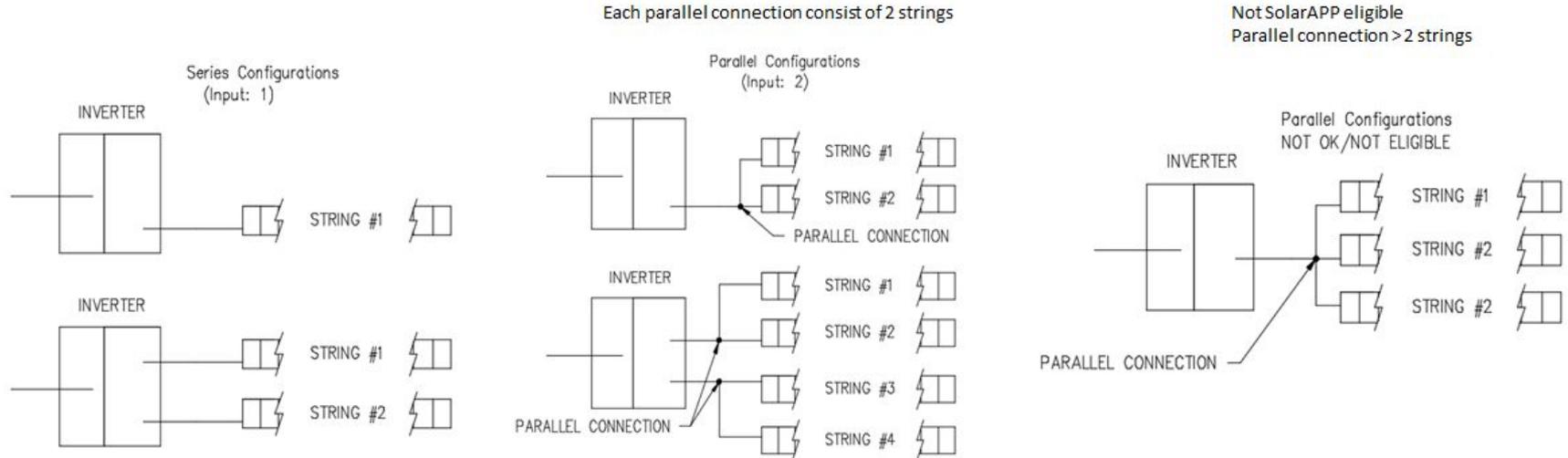
What is the maximum quantity of modules in a DC series string?

8 4



Series Strings in Parallel

1. How many series strings are combined in parallel?
 - When no strings combined in parallel enter 1.
 - When combining two series strings in parallel, enter 2.
2. An electrical parallel connection must consist of no more than 2 strings.
3. Note: ok to have multiple parallel connected strings so long as each connection consist of no more than 2 strings. See examples below.
 - See conduit schedule.



Electrical Page

For all architectures

1. Max number of AC CCC THWN wire in raceway = **(3)**
per inverter in a single raceway. The output of the combiner panel is default to (3)
2. Will NM cable be used? = **No** (See conduit schedule)
 - o Except: Microinverter Array conductors using NM cable in the attic for new construction =Yes

Circuit Requirements: Inverter Output AC

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

Will NM cable be used for inverter output circuits? (Note: If you install NM cable, it must be installed according to the Code.)



SolarAPP+ Contractor Input Training (All Jobs continued)

Electrical Page

For all architectures

1. Max number of AC CCC THWN wire in raceway = **(3)**
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Electrical Page

For all architectures

1. Sometimes, interconnection at a panelboard requires that certain circuit breakers be relocated to a new sub-panel to allow space to land the PV overcurrent protective device. See the electrical circuit diagram for new (N) sub-panels and their ratings.

New Panelboard for Relocated Loads

Will a new subpanel be installed with existing loads relocated into the new subpanel?

No

1



Electrical Page

For all architectures

1. When relocating loads from the main panel to a NEW sub panel to make room for the point of interconnection, = **See SLD for details**
2. Properly sized OCPD = **YES**
3. Busbar Ampere rating = **See system design**
4. Relocated loads Overcurrent protective device ampere rating = **See system design**
5. Is the subpanel located adjacent to the panelboard? = **See site plan detail**
6. Current Carrying Conductors includes relocated branch circuits AND Sub panel feeder conductors IF in a single raceway = **See system design**
7. Relocated branch circuits do not require ampacity derates if installed less than 2ft from panelboard. = **See Site plan detail**

New Panelboard for Relocated Loads

Will a new subpanel be installed with existing loads relocated into the new subpanel?

Yes

1

Is The OCPD ampere size supplying the relocated loads subpanel will be selected according to the code? (Verification of load calculation may be required at inspection)

Yes

2

Enter the busbar size of the new subpanel:

125

3

Enter the OCPD rating protecting the new subpanel with relocated loads:

50

4

Electrical Page

For all architectures

1. When Branch Circuit conductors for relocated loads are relocated greater than 2ft = **See site plan** (typically = **NO**)
2. Are relocated branch circuit conductors extended less than 10ft or 10% of total circuit length = **See Site plan** (typically = YES)
3. Current Carrying Conductors includes relocated branch circuit conductors AND Sub panel feeder conductors IF in a single raceway = **See system design**
4. Are branch circuit conductors for relocated loads extended more than 6ft = **See Site plan**
5. Will the raceway size for Sub Panel feeders be sized according to the code = **Yes**
6. Will the raceway size for relocated branch circuit conductors be sized according to the code = **Yes**

Are relocated branch circuit conductors in raceway = < 2'? [Chapter 9]

No 1

Are relocated branch circuits extended = < 10' and = < 10% of total circuit length? [310.15 (A)(2) Ex.]

Yes 2

Maximum quantity of current carrying conductors in raceway with relocated branch circuit conductors?

8 3

Are branch circuits extended > 6'? [210.12 (D)]

Yes 4

Will raceway size for new sub panel feeders be selected according to 300.17 and Chapter 9? YES

Yes 5

Will raceway size for branch circuit conductors be selected according to 300.17 and Chapter 9? YES

Yes 6

Electrical Page

For all architectures

1. When Branch Circuit conductors are relocated greater than 2ft = **NO**
2. Are branch circuit conductors less than = **YES**
3. Busbar Ampere rating = **See system design**
4. Sub Panel feeder breaker ampere rating = **See system design**
5. Is the subpanel located adjacent to the panelboard? = **See site plan detail**
6. Current Carrying Conductors includes relocated branch circuits AND Sub panel feeder conductors IF in a single raceway = **See system design**
7. Relocated branch circuits do not require ampacity derates if installed less than 2ft from panelboard. = **See Site plan detail**

Are relocated branch circuit conductors in raceway = < 2'? [Chapter 9]

No 1

Are relocated branch circuits extended = < 10' and = < 10% of total circuit length? [310.15 (A)(2) Ex.]

2

Maximum quantity of current carrying conductors in raceway with relocated branch circuit conductors?

3

Are branch circuits extended > 6'? [210.12 (D)]

4

Will raceway size for new sub panel feeders be selected according to 300.17 and Chapter 9? YES

5

Will raceway size for branch circuit conductors be selected according to 300.17 and Chapter 9? YES

6

SolarAPP+: Electrical: Point of Connection at Main Panel

Load Side 120% Rule

Electrical Page

For all architectures

- A loadside interconnection using the 120% rule is the most common method of installation for PV only projects. It relies on the maximum inverter output, main breaker and main bus ratings to determine code compliance.
- The method of interconnection will be a listed circuit breaker

Point of Connection at Main Panel

Point of Interconnection compliance method at MSP:

Main Bus Ampere Rating (A)

Main Breaker/Service Disconnect Ampere Rating (A)

What is the Utility service feed rated for?

Will power production inverter outputs be connected directly to an existing subpanel?

For example...

1. POI method at MSP = **705.12(B)(2)(3)(b) 120% rule** or **705.12(B)(2)(3)(d) 120% rule on center-fed panels** based on MSP
2. Main bus rating = **see SLD**
3. Main Breaker rating = **See SLD**
4. Utility service feed rated for = **See Main Breaker/Main bus rating**
5. Will inverter outputs be connected directly to a sub-panel = **No** for Meter socket adapter, check the SLD

SolarAPP+: Electrical: Point of Connection at Main Panel Supply Side

Electrical Page

For all architectures

- A supply-side interconnection is when the point of interconnection (POI) is ahead of the service disconnect (aka Main breaker). This can be accomplished through the use of an insulation-piercing connector, multi-port connector, breaker connector, meter lug connector, meter socket adapter, field evaluated supply-side connection, breaker connection at a main lug only (MLO) panel (aka “hot bus”), or a “solar-ready” panel slot.
- Each of these methods will have a specific “allowable backfeed” that SolarAPP+ will evaluate based on the answer to certain questions.

For meter socket adapter example...

1. POI method at MSP = **705.12(A) Supply-side**
2. Main bus rating = **see SLD**
3. Main Breaker rating = **See SLD**
4. Utility service feed rated for = **See Main Breaker/Main bus rating**
5. Service Equipment used = **Meter Socket Adapter as an example**
6. Enter the AMP rating of the equipment = As an example **60A**
7. Datasheet
8. Ampacity of the conductors fed by the SST = **Same as utility service rating**
9. Supply-side conductor length less than 10ft = **Yes**
10. Is the equipment used UL listed = **Yes**
11. Will inverter outputs be connected directly to a sub-panel = **No** for Meter socket adapter, check the SLD

Point of Connection at Main Panel

Point of Interconnection compliance method at MSP:

705.12 (A) Supply Side 1

Main Bus Ampere Rating (A)

100 2

Main Breaker/Service Disconnect Ampere Rating (A)

100 3

What is the Utility service feed rated for?

100 4

Select equipment used to make supply side connection:

Meter Socket Adapter 5

Enter the ampere rating of the equipment used to make the supply side connection?

60 6

Upload datasheet for the equipment used to make the supply side connection:

1620241480831-1202-12371_RMA_Flyer.08.pdf 7

What is the ampacity of the conductors that will be directly fed by the Supply Side connection? (In some cases this might be different from the utility service feeder ampacity, in most it will just be the utility service feeder ampacity)

100 8

Will the OCPD of the Supply Side Connection be installed within 10 ft of conductor length from it?

Yes 9

Is the equipment used to make the Supply Side Connection UL Listed?

Yes 10

Will power production inverter outputs be connected directly to an existing subpanel?

No 11

SolarAPP+: Electrical: Point of Connection at Main Panel Load Side Sum of Breakers Rule

Electrical Page

For all architectures

- A loadside interconnection using the Sum of Breakers rule is the most common method of installation for PV + Storage projects. It weighs the sum of breaker ratings on the bus plus the rating of the OCPD against the rating of the main bus. Design may relocate loads to a new subpanel to make this condition true.
- The method of interconnection will be a listed circuit breaker
- The sum of breakers will be validated at inspection by the AHJ.

Point of Connection at Main Panel

Point of Interconnection compliance method at MSP:

705.12 (B) (2) (3) (b) 120% rule 1

Main Bus Ampere Rating (A)

100 2

Main Breaker/Service Disconnect Ampere Rating (A)

100 3

What is the Utility service feed rated for?

100 4

Will power production inverter outputs be connected directly to an existing subpanel?

No 5

For example...

1. POI method at MSP = **705.12(B)(2)(3)(c) Sum of Breakers rule**
2. Main bus rating = **see SLD**
3. Main Breaker rating = **See SLD**
4. Utility service feed rated for = **See Main Breaker/Main bus rating**
5. Will inverter outputs be connected directly to a sub-panel = **Check the SLD for a sub-panel interconnection**

Electrical Page

For all architectures

- A loadside interconnection may occur at a sub-panel. Specific compliance methods can be chosen at both the sub-panel and main panel boards.
- The method of interconnection will be a listed circuit breaker
- The sum of breakers will be validated at inspection by the AHJ.
- Interconnection rules must be maintained for all panelboards and conductors that carry the system backfeed to the utility grid.

Will power production inverter outputs be connected directly to an existing subpanel?

Yes 1 ▼

What is the subpanel busbar Amp rating?

125 2

What is the subpanel over current protection (breaker) Amp rating?

60 3

Point of interconnection compliance method at Subpanel:

705.12 (B) (2) (3) (b) 120% rule 4 ▼

For example, when applicable...

1. Interconnection at sub-panel = **Yes**
2. Main bus rating = **see SLD**
3. Main Breaker rating = **See SLD**
4. POI method at MSP = **705.12(B)(2)(3)(c) Sum of Breakers rule**

Standard Certifications

Workers' Comp

1. Agree to the terms and conditions and submit the project.

SolarAPP Standard Certifications

Standard Certifications.

Workers' Comp Information

By applying for this permit, you represent and warrant that you (i) have (and will have during the performance of the work) all valid approvals, certifications, and licenses required for the performance of the work for which this permit is issued, (ii) carry (and will carry during the performance of the work) all necessary insurance required by law or governmental authority in the jurisdiction and (iii) will comply with all applicable laws required in the performance of the work.

I agree to these terms and conditions.

Previous

[Save as a draft](#)

Submit Project

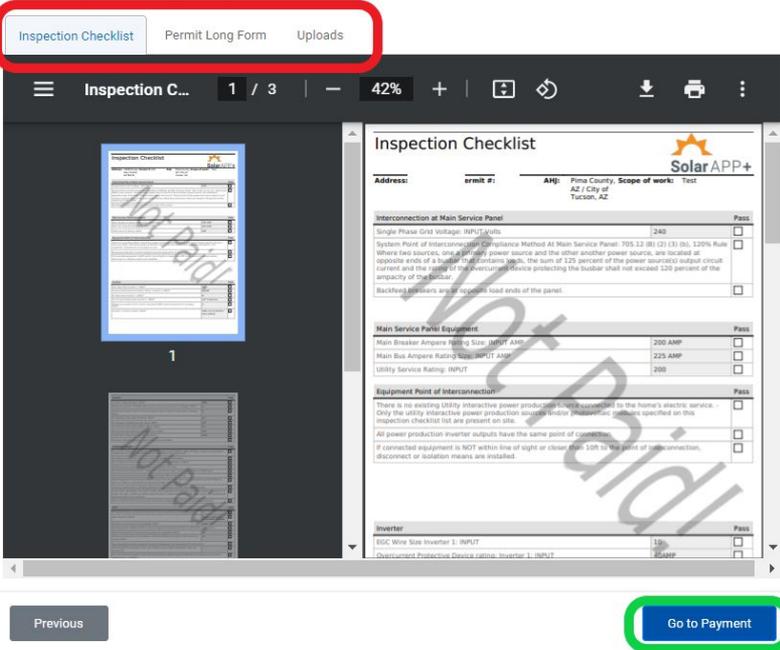
Review your Project Details

Review Your Project Details

1. Review Inspection checklist and Permit Long form for accuracy
2. Go to payment.

Review Your Project Details

Your project design meets all requirements for SolarAPP approval. Please review your project details below to ensure they are accurate and proceed to pay for your SolarAPP approval.



Inspection Checklist Permit Long Form Uploads

Inspection C... | 1 / 3 | 42%

Inspection Checklist

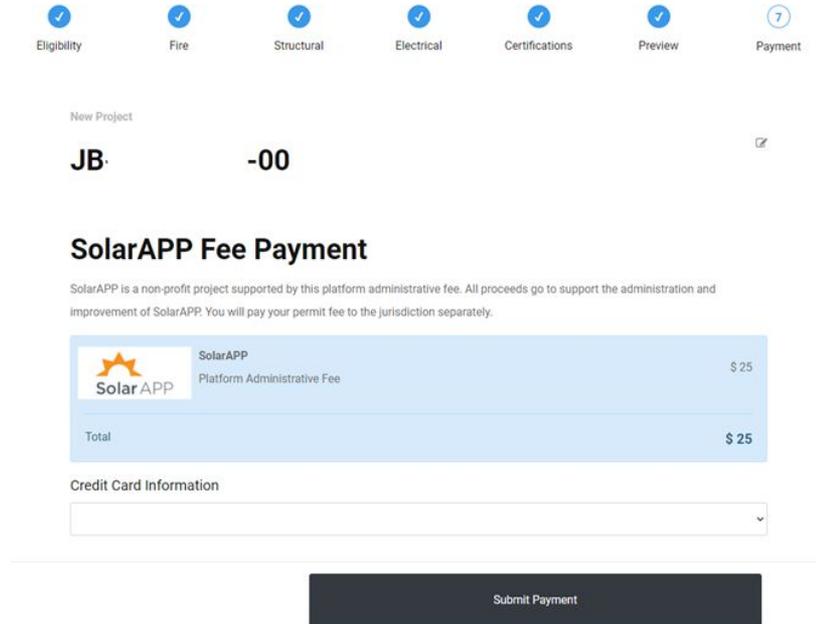
Address: **Permit #:** **AHJ:** Pima County, **Scope of work:** Test
AZ, City of Tucson, AZ

Section	Item	Value	Pass
Interconnection at Main Service Panel	Single Phase Grid Voltage- INPUT/Output	240	<input type="checkbox"/>
	System Point of Interconnection Compliance Method At Main Service Panel: 705.12 (B) (2) (1) (b), 120% Rule		<input type="checkbox"/>
	When two sources, one primary power source and the other another power source, are located at opposite ends of a busbar that contains both, the sum of 125 percent of the power (output) output circuit current and the output of the conversion device protecting the busbar shall not exceed 120 percent of the ampacity of the busbar.		<input type="checkbox"/>
	Backfeed breakers are at opposite load ends of the panel.		<input type="checkbox"/>
Main Service Panel Equipment	Main Breaker Ampere Rating Size- INPUT/ Amp	200 AMP	<input type="checkbox"/>
	Main Bus Ampere Rating Size- INPUT/ Amp	225 AMP	<input type="checkbox"/>
	Utility Service Rating- INPUT	200	<input type="checkbox"/>
Equipment Point of Interconnection	There is no existing utility interactive power production system connected to the home's electric service - Only the utility interactive power production system (generator, photovoltaic, etc.) specified on this inspection checklist list are present on site.		<input type="checkbox"/>
	All power production inverter outputs have the same point of connection.		<input type="checkbox"/>
	If connected equipment is NOT within line of sight or clear view, SOG to the point of interconnection, disconnect or isolation means are installed.		<input type="checkbox"/>
Inverter	IEC Wire Size Inverter 1- INPUT	10	<input type="checkbox"/>
	Disconnect/Protective Device rating- Inverter 1- INPUT	60AMP	<input type="checkbox"/>

Previous **Go to Payment**

Review Your Project Details

1. Enter card information and submit payment.
2. If permit approval is also required via AHJ website, SolarAPP+ will prompt and provide direct link to AHJ permit submittal page.
3. Complete permit application through AHJ website and upload SolarAPP+ approval documents and uploads (per instructions from AHJ).



The screenshot shows a progress bar at the top with seven steps: Eligibility, Fire, Structural, Electrical, Certifications, Preview, and Payment. The Payment step is highlighted with a '7' in a circle. Below the progress bar, the project name 'JB' is displayed next to a price of '-00'. A checkbox is visible to the right. The main section is titled 'SolarAPP Fee Payment' and includes a disclaimer: 'SolarAPP is a non-profit project supported by this platform administrative fee. All proceeds go to support the administration and improvement of SolarAPP. You will pay your permit fee to the jurisdiction separately.' Below this is a table with two rows: 'SolarAPP Platform Administrative Fee' for \$25 and 'Total' for \$25. A 'Credit Card Information' field is present with a dropdown arrow. At the bottom right, there is a dark grey button labeled 'Submit Payment'.

Step	Status
Eligibility	✓
Fire	✓
Structural	✓
Electrical	✓
Certifications	✓
Preview	✓
Payment	7

New Project

JB -00

SolarAPP Fee Payment

SolarAPP is a non-profit project supported by this platform administrative fee. All proceeds go to support the administration and improvement of SolarAPP. You will pay your permit fee to the jurisdiction separately.

 SolarAPP Platform Administrative Fee	\$25
Total	\$25

Credit Card Information

Submit Payment