





***This checklist is to be completed before starting up the system. Record all requested information.***

- Attach as-built array layout sketch including string layout, tilt and orientation
- Array and Racking
  - Racking is straight and square
  - Racking system is neatly trimmed and fully tightened
  - All module connections are tight and fully seated
  - All module clamps are tight and properly seated
  - Array and racking system is fully grounded using industry standard ILSCO GBL4-DBT lay-in lugs w/ 10-32 SS screw, nut, and two star washers, for aluminum frame modules, and UV resistant grounding wire
  - All attachments to building structure are secure and properly sealed
- Wiring
  - All wires are properly stripped and properly terminated (no loose strands)
  - All connections are tight and pass tug test
  - Wire insulation is not scuffed or broken
  - All wiring is neat, tidy, and left at appropriate “service loop” lengths
  - Junction between USE-2 and in-raceway (non-UV rated) wiring should be properly spliced with insulated tap connectors.
  - Drip loop is allowed before all strain relief fittings
- Conduit and Metal Clad Cable
  - All conduit fittings are tight
  - All conduit blocks on roof are securely fastened and glued to roof
  - EMT conduit supported within 3’ of every junction box and at least once every 10’
  - LFMC conduit is supported within 1’ of every fitting and at least once every 4 1/2’
  - MC cable is supported within 1’ of every cable termination and at least once every 6’
  - No more than 360° of bends between pulling points
  - Correct fittings are used indoor and out
  - All condulets and pull boxes are accessible and covers are closed
  - **Conduit or MC sheath is not being utilized to accomplish component equipment grounding at any point in the installation**
- Inverter
  - DC input conductors are landed to marked terminals
  - DC input polarity is correct (check with manufacturer instructions for positive or negative grounded systems)
  - AC ungrounded conductors are landed to appropriate AC terminals
  - AC grounded conductor (neutral) wire (if required) is landed to appropriate AC terminal



- #10 or larger AC equipment ground wire is terminated according to manufacturer's specification
- #10 or larger DC equipment ground wire is terminated according to manufacturer's specification
- #8 or larger grounding-electrode conductor is terminated according to manufacturers spec and runs unbroken directly to either a dedicated DC grounding electrode or the existing AC grounding electrode. If the DC grounding-electrode conductor is connected to a DC grounding electrode, then the DC grounding electrode must be bonded to the AC grounding electrode using #8 AWG Cu.
- All inverter cabinet screws and washers are intact and tight
- Inverter is labeled
- DC disconnect
  - Polarity is correct (check with manufacturer instructions for positive or negative grounded systems)
  - Current carrying conductors from array terminate to upper disconnect lugs
  - Current carrying conductors to inverter terminate to lower disconnect lugs
  - Ground bushings or lock nuts on all conduit fittings
  - DC equipment ground wire is properly bonded to disconnect cabinet via lay-in lug or other approved means
  - Disconnect is labeled
- AC disconnect
  - Ungrounded conductors from AC point of connection terminate to upper disconnect lugs
  - Ungrounded conductors from inverter terminate to lower disconnect lugs
  - Grounded conductor (neutral) wire (if required) runs **unbroken** through disconnect
  - AC equipment ground wire is properly bonded to disconnect cabinet via lay-in lug or other approved means
  - Ground bushings and/or lock nuts are installed on all conduit fittings
  - Disconnect is labeled
- All equipment is labeled according to NEC article 690
  - Modules Labeled (690.51)
  - DC Disconnect Labeled (690.35 - F), (690.17 - 4), (690.53)
  - Inverter Labeled (690.5 - C)
  - AC Disconnect Labeled (690.17) (690.54)
  - Circuit breaker (690.54)(690.64 - 7)
  - Permanent placard at primary utility meter (690.56 - B)
  - BEF contact information decal on inverter
  - Electrical contractors contact information decal
- Walk around the arrays and workspace carefully checking for incomplete items:



- Pickup all litter, leftover components, and tools around the worksite. Make sure everything is tidy, vacuum out any dust created from mounting the disconnect boxes, inverters, etc.
- Check for anything else that doesn't look finished or correct. Check under the panels and in gutters for debris
- Assure that all steel strut is properly sprayed with galvanizing spray
- Take photos of the system using a digital camera. Make sure good pictures of the panels, conduit disconnects, inverters, and overall installation are taken.
- Using a voltmeter, verify correct polarity on each of the strings at either the array combiner box or the inverter DC input terminals. Record the string voltage in the following table and verify that each equal sized string has a voltage of difference of no greater than +/-10 V from each other.

Measured string voltage at inverter *before* terminated:

| String # | Measured voltage |
|----------|------------------|
|          |                  |
|          |                  |
|          |                  |
|          |                  |



### *System Start-up*

- Follow inverter manufacturer instructions for start-up procedure
- After system is turned on:
  - Average output power from inverter display after inverter is stabilized:  
(watts)
  - Notes on weather conditions (sun location, fog, temperature, etc):
  - Irradiance (if a measurement device is available)
  - Based on the weather conditions and/or irradiance readings, is the power output what is expected?
- Contact Fat Spaniel Technologies to verify data transmission.
- Compare FST Power Data with Inverter LCD Output
- Compare FST Environmental Data with actual conditions
- 
- Contact the Bonneville Environmental Foundation Project Manager, while still on-site, to let them know that the installation is complete.
- Please submit this Commissioning Checklist, photos of the final installation and documentation as listed in the Project Documentation Checklist to BEF.