

# Solar System Installation Guide

## Pre-Installation

### Site Assessment

1. **Roof Evaluation**
  - Age and condition of roof
  - Structural integrity
  - Shading analysis
  - Available mounting space
2. **Electrical Assessment**
  - Main service panel capacity
  - Grounding system
  - Interconnection point
  - Backup power requirements
3. **Documentation**
  - Building permits
  - Utility interconnection agreement
  - HOA approval (if required)
  - Engineering calculations

## Safety Requirements

### Personal Protection Equipment

- Hard hat
- Safety glasses
- Steel-toed boots
- Fall protection harness
- Work gloves
- High-visibility vest

### Job Site Safety

- OSHA compliance
- Fall protection setup
- Fire safety equipment
- First aid kit
- Emergency contact information
- Safety perimeter establishment

## Installation Process

### 1. Roof Preparation

- Clean work area
- Locate and mark rafters

- Install mounting points
  - Flash all roof penetrations
  - Ensure proper sealing
  - Maintain proper spacing

## **2. Racking Installation**

- Install rails according to design
- Level and align all components
- Torque to specifications
- Weather sealing
- Grounding/bonding

## **3. Panel Installation**

### **1. Panel Preparation**

- Inspect all panels
- Install optimizers (if used)
- Attach mounting hardware

### **2. Mounting Process**

- Secure panels to rails
- Maintain proper spacing
- Install end clamps
- Torque all connections

## **4. Electrical Installation**

### **DC Wiring**

#### **1. String Configuration**

- Follow wiring diagram
- Maintain proper polarity
- Use appropriate wire gauge
- Install disconnects

#### **2. Wire Management**

- Secure all cables
- UV protection
- Proper bend radius
- Label all conductors

### **AC Wiring**

#### **1. Inverter Installation**

- Mount securely
- Maintain clearances
- Connect AC and DC
- Install rapid shutdown

#### **2. Grid Connection**

- Install AC disconnect
- Connect to main panel
- Install production meter
- Label all components

## **5. Monitoring Setup**

- Install gateway
- Configure network
- Test communication
- Verify data reporting

## **Quality Control**

### **System Verification**

#### **1. Mechanical Inspection**

- All mountings secure
- Proper torque on bolts
- Roof integrity verified
- No panel damage

#### **2. Electrical Testing**

- Continuity checks
- Voltage measurements
- Polarity verification
- Insulation resistance
- Ground fault check

### **Documentation**

- As-built drawings
- String map
- Photos of installation
- Test results
- Permit signatures

## **System Commissioning**

### **Startup Procedure**

#### **1. Pre-Power Checklist**

- All connections verified
- All switches off
- Area clear of personnel

#### **2. Power-Up Sequence**

- DC activation
- AC activation
- Inverter startup
- System monitoring

### **Performance Verification**

- Production test
- Efficiency check
- Communication test
- Safety system check

# Customer Handoff

## Documentation Package

- Warranty information
- Operation manual
- Maintenance schedule
- Emergency procedures
- Contact information

## Customer Training

- Basic operation
- Monitoring system use
- Safety procedures
- Maintenance requirements
- Troubleshooting guide

## Maintenance Access

### Service Points

- Inverter locations
- Disconnect positions
- Monitoring equipment
- Junction boxes
- Ground points

### Access Requirements

- Roof access points
- Equipment clearances
- Safety tie-off points
- Storage of spares

## Emergency Procedures

### Shutdown Sequence

1. **Normal Shutdown**
  - AC disconnect
  - DC disconnect
  - Verification
2. **Emergency Shutdown**
  - Rapid shutdown activation
  - Main disconnect
  - Emergency services info

### Emergency Contacts

- System installer

- Utility company
- Fire department
- Technical support
- Monitoring service

## **Appendix**

### **Tools Required**

- Torque wrench
- Multimeter
- Wire strippers
- Conduit bender
- Level
- Power drill
- Socket set

### **Fastener Specifications**

- Mounting bolts
- Rail clamps
- Panel clamps
- Ground lugs
- Wire management

### **Reference Documents**

- NEC requirements
- Local codes
- Manufacturer specs
- Warranty terms
- Utility requirements