Eagle Eye Application Note - AN075

Installing Two 100W Solar Panels on the Eagle Eye SS212 Anywhere Cabinet System

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Target Audience

This application note provides a step-by-step guide for professional installers on how to install two 100W solar panels for use with the Eagle Eye SS212 Anywhere Cabinet System. This installation optimizes performance by connecting both panels in parallel; it is specifically designed for pole-mounted setups. This document is for installers knowledgeable about electrical installation.

Installation Considerations

Before installing two solar panels on the Eagle Eye SS212 Anywhere Cabinet System, review the following safety precautions and gather the necessary materials.

Safety Precautions

- Ensure all electrical work complies with local codes and regulations.
- Wear personal protective equipment (PPE).
- De-energize any connected power sources before installation.
- Use insulated tools to prevent accidental electrical shocks.

Materials Needed

- Two 100W solar panels (EN-SL-102)
- Eagle Eye Networks SS212 Anywhere Cabinet
- Solar panel mounting brackets (Supplied)
- Pole or light pole (with sufficient height for unobstructed sunlight)
- EN-SZ002 Y-cable with MC4 connectors
- Tools: drill, screwdriver, wire cutters/strippers, wrench, multimeter

Installation Overview

Installation can be viewed as three steps: planning, mounting, connecting. Planning is the most important and involves multiple considerations. Mounting may be difficult simply because of the awkwardness of working height and handling large panels. With good planning and patience, the installation should be straightforward. Connecting is easy: just plug in the MC4 connectors to provide power to the cabinet.

Planning Steps

1. **Material and Strength:** Ensure the pole is structurally sound and capable of supporting the weight of both solar panels, mounting hardware, and the cabinet. Consider factors such as wind load and local weather conditions.
2. **Location:** Shadows falling on any portion of the panels will significantly reduce the power available. Ensure that the installation site has full exposure to sunlight, ideally for at least 8 hours per day. Ensure there are no obstructions (trees, buildings, etc.) that will cast shadows on the panels.
3. **Height Considerations:** The pole should be tall enough to place both panels one above the other. Due to the limitations of one pole and the mounting brackets for the solar panels, one panel must be installed directly above the other. Ensure you have sufficient distance between the two panels so that the upper panel does not cast a shadow on the lower panel even in the summer when the sun is highest in the sky.

Figure 1: Lower 48 U.S. States Latitude Map

Refer to the map above to determine the distance between the two solar panels.

- If the installation location is below 30° latitude, the solar panels should be separated by at least 36 in.
- If the installation location is below 35° and above 30° latitude, the solar panels should be separated by at least 26 in.
- If the installation location is below 40° and above 35° latitude, the solar panels should be separated by at least 19 in.
- If the installation location is below 45° and above 40°latitude, the solar panels should be separated by at least 15 in.
- If the installation location is below 50° and above 45° latitude, the solar panels should be separated by at least 11 in.

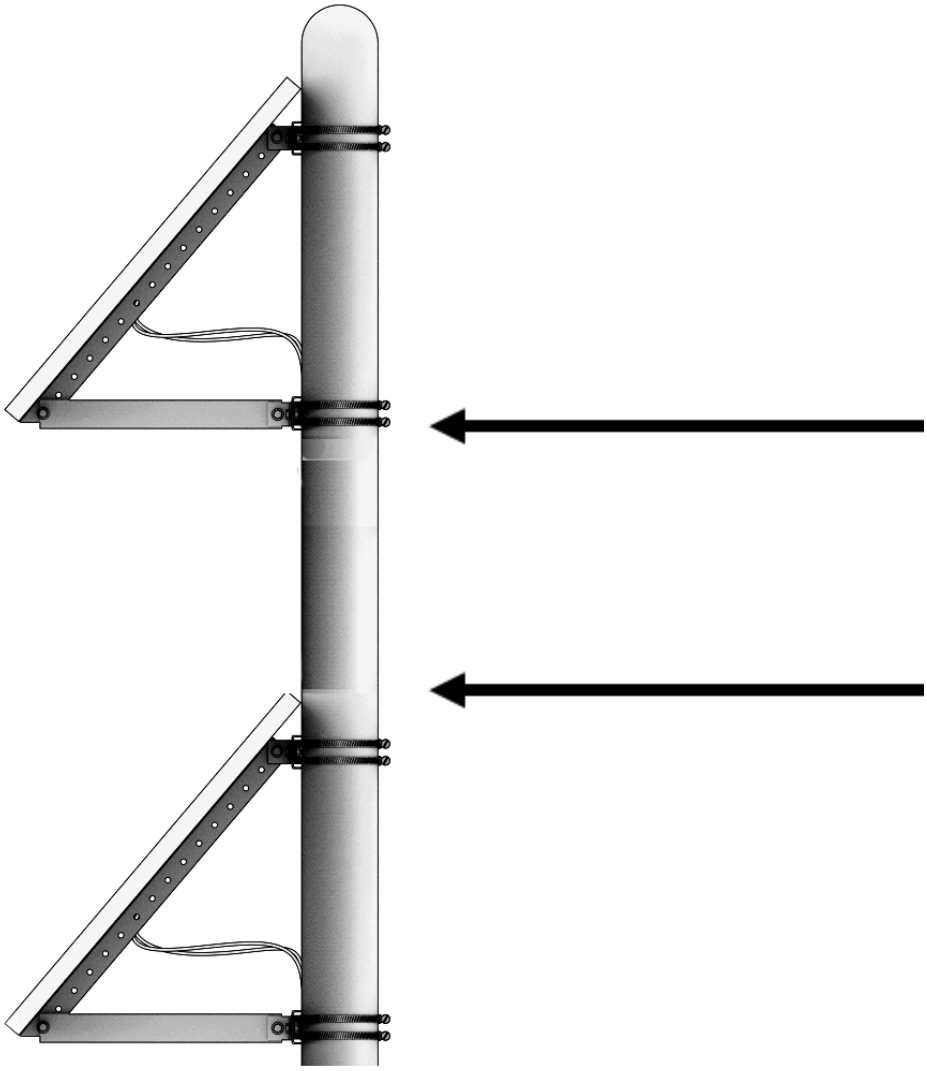
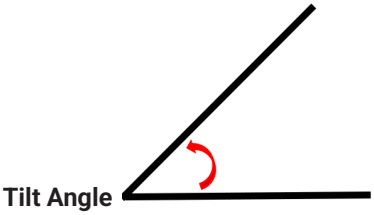


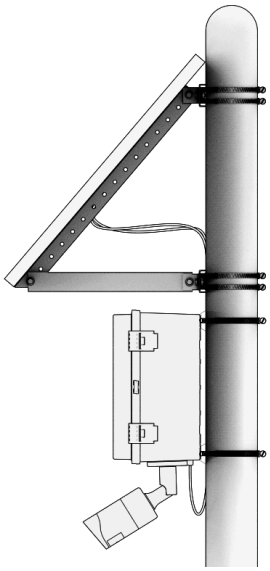
Figure 2: Correct Positioning of Solar Panels on Pole. Distance Between Panels varies by Latitude.

4. **Orientation:** Solar panels should face due (true) south to capture the most sunlight. Make sure to face the solar panels towards the true South, not magnetic South. In some locations the difference between true South and magnetic South could mean a loss of more than 5% of power. Both panels must be aligned and face true South. **Note**: Most smart phones can find true South. **Square Poles:** Installations on square poles may make facing due South difficult. We offer two different corner brackets to address this situation: EN-CACM-001 or EN-CACM-002. Either will allow the panels to be mounted on the corner of a square pole.

5. **Panel Tilt:** The angle to tilt the panels is important to get as much of the sun's energy as possible but is not as important as the orientation toward the South and getting any set angle closer than +/- 3-4 degrees is difficult with this installation. The angles listed in the chart below are optimized for year-round performance with an emphasis on Winter performance.

Use the map above to find your latitude and then read the chart to find the proper tilt angle. Again, both panels must be tilted to the same degree.





Latitude	25°	30°	35°	40°	45°	50°
Tilt Angle	40°	45°	50°	55°	60°	65°

Installation Steps

1. **Mount the Solar Panels**
   Note:The panels are large and awkward to position with the brackets attached. Do not attempt to mount the panel without assistance. Two hands are needed to thread the metal strap into the worm gear and to tighten it.

   - After determining the proper tilt angle for the panels, set that angle on the brackets that hold the solar panels. Measure the distance between the top and bottom. Make a mark on the pole at the appropriate distance to guide you as you install the mounting brackets and straps.
   - Thread the metal straps through the solar panel brackets. Then wrap the strap around the pole and into the worm gear and tighten the straps. A drill is not required but highly suggested to tighten the strap using the worm gear.
   - Secure both panels to the pole. Position them at the proper angle for your geographical location. Ensure they are both at the same angle.
   - Ensure the panels are securely fastened to withstand wind and weather conditions.

2. **Configure the Panels in Parallel**
   - Connect the two solar panels electrically and physically in parallel to ensure optimal performance. You must point the two solar panels at the same angle towards the sky. Tilting one at another angle to get more sun at a different time of day or different time

of the year will cause the pair to generate power at the performance level of the lesser one.

- Connect the two solar panels in parallel to maintain the voltage while increasing the current. This is done by connecting the positive terminal of the first panel to the positive terminal of the second panel and the same for the negative terminals. **Note:** Use care when tracing the connections to ensure the proper polarity. When using solar cables with MC4 connectors the keyed connectors will prevent mistakes but may add confusion because of color changes.
- Our Y-connectors (EN-SZ002) have MC4 connectors that are keyed to make it easier and are weather-resistant. If longer cables are required for a location that is not adjacent to the cabinet, solar extension cables with MC4 connectors are recommended and readily available.

3. **Connect the Panels to the Eagle Eye Networks SS212 Cabinet**
    - Refer to the Eagle Eye SS212 Anywhere Cabinet Quick Start Guide.
4. **Test the Installation**
    - Double-check all connections and ensure they are secure.
    - Verify that the solar panels remain unobstructed by any shadows throughout the day.
    - Clean the solar panels to remove any dirt or debris that may hinder their performance.

Additional Installation Considerations

Maintenance Tips

- Clean Regularly: Periodically clean the solar panels to remove any dirt, dust, or debris that may accumulate and block sunlight. This can significantly improve efficiency.
- Inspect Connections: Regularly check connections.

Regulatory Compliance

- Permits and Zoning: Check with local authorities regarding any necessary permits or zoning regulations for installing solar panels on public or private property.
- Safety Codes: Ensure that all installations comply with the National Electrical Code (NEC) and other relevant electrical safety standards.

Troubleshooting Common Issues

Low Power Output

If the system is not producing the expected power, check for shading, dirty panels, loose connections, or faulty components.

Inconsistent Performance

Monitor performance over time and look for patterns related to environmental conditions, such as seasonal changes in sunlight exposure.

Connection Problems

If the system is not functioning, inspect all wiring and connections for damage or disconnection.

Conclusion

Following the instructions in this application note will ensure a successful installation of two 100W solar panels for the Eagle Eye SS212 Anywhere Cabinet System. This setup will provide reliable power, enhancing the performance and longevity of the cabinet in outdoor applications. Always refer to the product manuals for specific details and safety guidelines.

For more information on operation or troubleshooting tips, please contact your reseller or contact Eagle Eye Networks: www.een.com/support.