

OPTIMAL WIRING FOR Q.PEAK DUO-G5 BY Q CELLS

INTRODUCTION

Hanwha Q CELLS newly-developed Q.PEAK DUO-G5 module utilizes a three part decentralized junction box in order to accommodate the 120 half-cell design. After extensive testing a junction box with an angled cable was selected, along with rotating one of the 3 junction box parts 180°. This allowed the easiest installation on average, across the range of mounting options possible with Q.PEAK DUO-G5 modules.

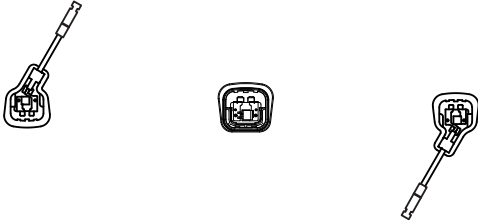


Figure 1: Current Q.PEAK DUO Junction Box Design

This whitepaper illustrates possible cabling options with this new generation of module design. There are a number of options detailed here, however other cabling options beyond these are permitted so long as cable length, maximum cable bending, and other restrictions detailed in the installation manual are observed.

Key Points

- To avoid complex cabling arrangements, it is often advantageous to rotate some modules 180°.
- Module orientation can clearly be identified from the front side by the serial number and barcode behind the module glass on the side with negative connection cable

Figures 2-1 and 2-2 illustrate the advantage of cabling arrangements found when rotating some modules 180°. Due to the design of the junction boxes, the cables always exit the box in the same direction, even if the module is rotated 180°, however the poles will be reversed. The orientation can also be identified from the front-side by the serial number and barcode label underneath the glass. This label is always on the side with the negative (-) connection cable. Following illustrations depict front side view of modules, with junction box visible.

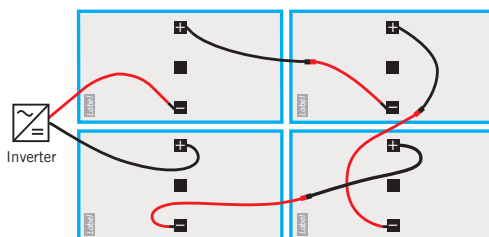


Figure 2-1: Un-optimized Cabling

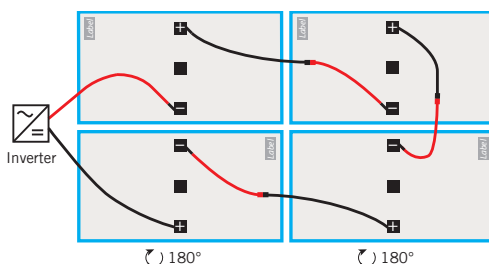


Figure 2-2: Optimized Cabling

CABLE BENDING

Some un-optimized cabling arrangements result in the cable needing to travel to the opposite side of the module to the direction it exits the junction box. This can result in tight turns and high bending of the cable. As per the installation manual, the maximum allowed bend of the cable is within a radius of 8 times the width of the cable. For example, the current standard cable is <7.5 mm, resulting in a maximum bending radius of 60 mm.

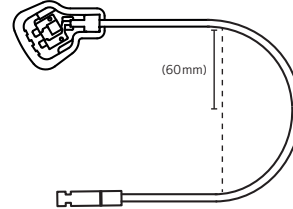


Figure 3: Example of maximum cable bending

EAST-WEST SYSTEMS

The design of the DUO modules is also optimized for Q.FLAT the East-West mounting system for flat roofs offered by Q CELLS. When using this, or similar East-West mounting systems, the cables can be easily reached and connected whilst installing the module. By rotating either the East section of a row relative to the West section (Figure 4-1) or by rotating alternate rows (Figure 4-2) the simple cabling arrangements below can be achieved.

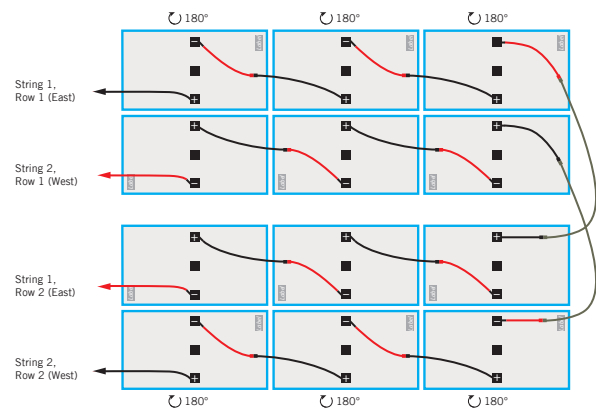


Figure 4-1: East-West System wiring – String Rotation

It is important to be aware of the orientation of modules in neighboring rows. In both examples above String 2 – Row 1 is not rotated, however String 2 – Row 2 is. This means that interconnection of rows needs to be considered before installation of modules to ensure effective connection at commissioning.

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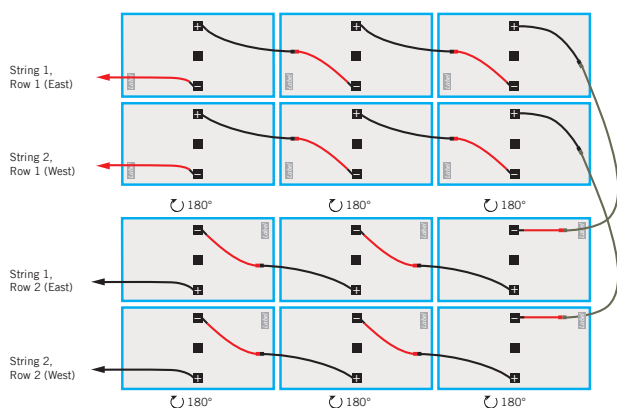


Figure 4-2: East-West System wiring – Row Rotation

STANDARD WIRING

For most installations, connection of modules over the long frame side is common. The DUO design offers 4 major options for cabling in this way.

- Un-rotated – where all modules have the same orientation
- Tight – rotated, modules utilize full cable length to minimize required cable management
- Loose – rotated, modules have minimal distance between connection points
- Next neighbor – removing requirement for return cables

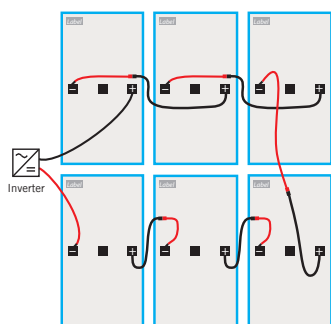


Figure 5-1: Un-rotated

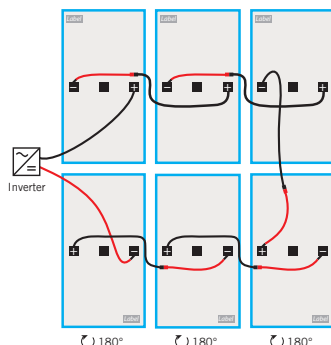


Figure 5-2: Tight

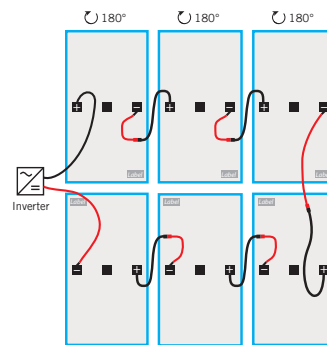


Figure 5-3: Loose

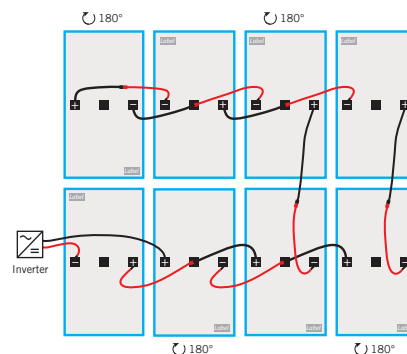


Figure 5-4: Next neighbor

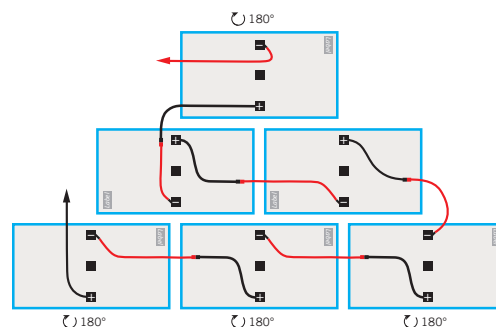


Figure 6: Pyramid Arrangement (partially rotated)

STAGGERED PORTRAIT WIRING

To fully utilize roof space it is sometimes useful to use a staggered or pyramid arrangement of modules. In these cases, it can also be advantageous to rotate alternate rows of modules to minimize cabling complexity, however the Q.PEAK DUO-G5 comes with sufficient cable to allow for installation of partially rotated arrays and non-rotated arrays.

SUMMARY

When cabling of the Q.PEAK DUO-G5 is not planned beforehand, it can result in complex cabling arrangements. However if planned beforehand cabling arrangements can be optimized with new, previously unavailable, layouts now being possible. Whilst this brings complexity for initial installations, the same cabling scheme can be applied to many sites reducing installation effort in the medium-term.