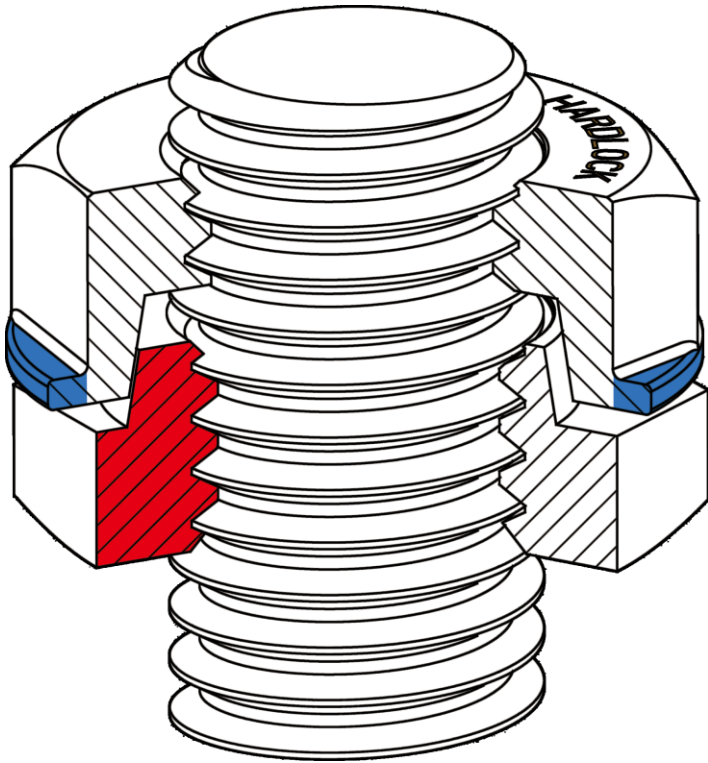


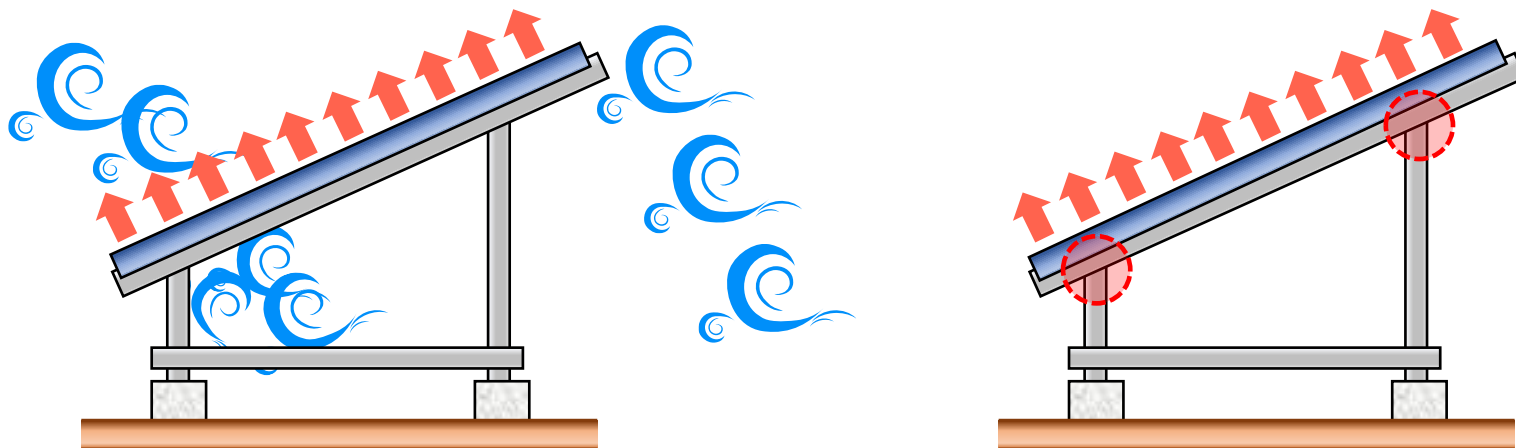


HARDLOCK[®]
Solution

**Solar Panel
Applications**

Wind load effects on ground and roof mounted solar panel system

Solar panels are either mounted on rooftops or on the ground and are exposed to the wind which exerts forces on them, in the form of drag or lift or a combination of both. Drag and lift forces on a flat panel could result from the shear stress at the panel's surface or the difference in pressure induced by the wind on both sides of the panel or a combination of both phenomenon. Especially **the connecting parts of solar panels and mounting structures** tend to loosen due to such wind load, for which HARDLOCK® solution can be best used.



Wind is blowing in the direction, which exerts lift force on a flat panel

Numerous bolted joints are used to construct solar mounting system and it is difficult to carry out complete check on every joint on the upper side of panel arrays. HARDLOCK® Nut is extremely effective at increasing the reliability of these joints by preventing all loosening.



Safety is power!

CK®

Roof top installation

NTT Docomo Yoyogi Building

Location: Yoyogi, Tokyo

Capacity: 10kW

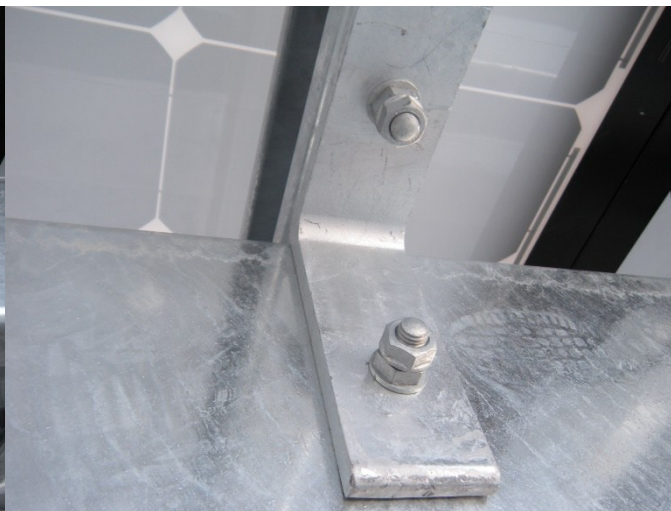
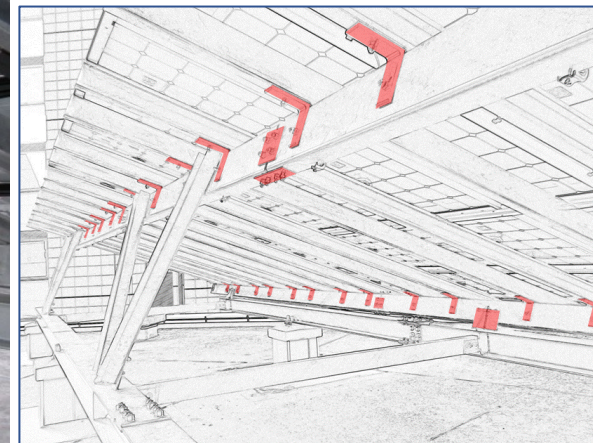
Operation date: Sep 2000

HARDLOCK® Nut:

HLN-R M12x1.75 & M16x2.0 SS400

Hot Dip Galvanized plating

HARDLOCK® Nuts are used for connecting parts of solar panels and mounting structures to ensure the prevention of panels coming off.

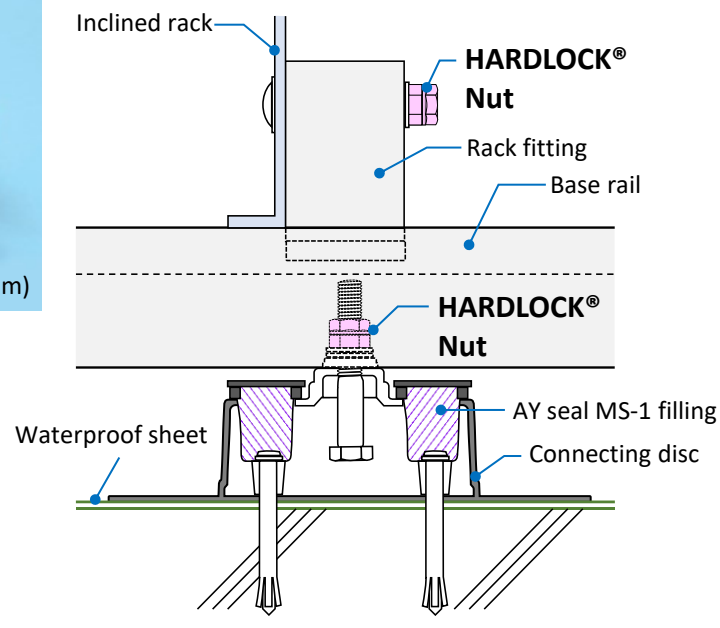
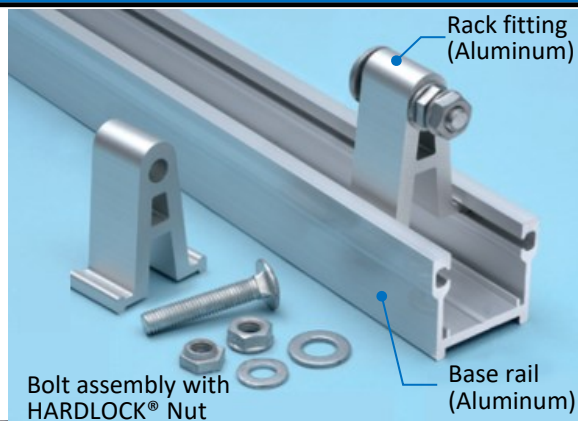
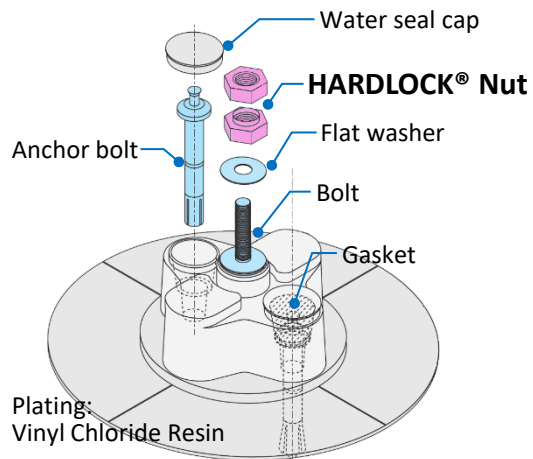


Solar Panel Mounting System combined with Roof Waterproofing

HARDLOCK® Nut: M10x1.5 SUS304

The most important thing for solar panels on the roof is to prevent them from being torn from the mounting and falling.

Aluminum Die Casting Connecting Disc



Connecting Discs on the waterproof sheet

Racking system



Mega Solar Power Plant

JRE Inashiki Isatsu Solar Power Plant

Location: Inashiki city, Ibaraki
Capacity: 6,052kW (18,340 panels)
Annual power: 7mil.kWh generation
Operation date: 1 Apr 2019

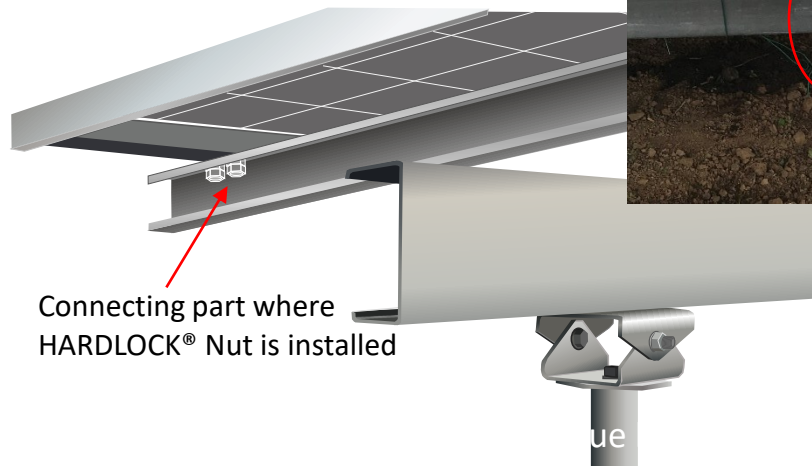


HARDLOCK® Nut: 175,000pcs installed
HLN-R M8x1.25 SS400 Zirconium coating + GEOMET

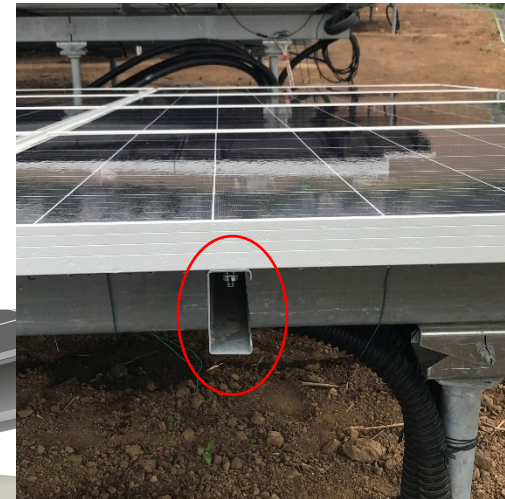
The connecting parts between solar panels and mounting structure are most affected by wind and tend to loosen.

Nominal wind speed of the area: 30m/s JIS C8955

The combination of double nut and Idaring (Pal nut) was originally used for fixing solar panels on mounting structure, which was thoroughly changed to HARDLOCK® Nuts just after installation of 10,000 sets. It was time consuming and troublesome work for inexperienced workers along with necessity of switching tools from electric wrench to spanner and tight work space.



Connecting part where
HARDLOCK® Nut is installed



Ida-ring & Double nut



Safety is power!