

Mounting Bracket for PV Modules 光伏组件支架产品

As an essential balance part of system in PV power plants, mounting bracket plays functions such as support of PV modules, resistance of wind load and snow load, safety of grounding, etc. Its quality affects the income of the power plants directly, which is concerned by more and more owners.

在光伏电站中，支架作为重要的系统平衡部件，起到支撑组件、抵抗载荷、安全接地等众多功能，其质量优劣也直接影响着光伏电站的收益，已被越来越多的业主所关注。

At present, PV power plants mainly adopt fixed metal or composite mounting bracket, PV tracker and polymer floating buoy for floating PV plants. TÜV NORD provides a comprehensive testing and certification schemes for all kinds of mounting bracket to verify the mechanical, electrical, weather resistance and other characteristics of the products. Meanwhile, TÜV NORD carries out relevant production supervision and pre-shipment inspection services to enhance the owner's confidence in the products they purchased.

目前，光伏电站主要采用的是金属 / 复合材料固定支架、跟踪支架，以及针对水上光伏所使用的高分子聚合物浮体。TÜV NORD 针对各类支架产品，提供完整的检测与认证方案，验证产品的力学、电学、耐候等特性。同时，TÜV NORD 开展相关的生产监造和出货前检验服务，增强业主对所购买使用产品的信心。

Testing and Certification 检测与认证



Fixed metal or composite mounting bracket 金属 / 复合材料固定支架
Certification including the assessment of mechanical and chemical properties of various profiles produced by hot rolling, cold forming or other methods, load assessment for the whole structure, assessment of weather resistance of anti-corrosive coatings and lightning protection in the system installation.
包含针对热轧、冷成型或其他方法生产的各种型材的力学和化学特性评估；整体结构的载荷评估；防腐涂层的耐候性评估以及系统安装中的防雷导电特性。



PV Trackers 跟踪支架
According to IEC 62817:2014+AMD1:2017, the evaluation is based on the mounting bracket evaluation, adding calculation of failure rate, tracking calculation of accuracy, and high wind avoidance evaluation.
根据 IEC 62817:2014+AMD1:2017 进行产品认证，评估内容在固定支架的评估基础上，加入了故障率计算，跟踪精度计算以及大风避险的评估等。



Floating Bracket 浮筒支架
HDPE floating buoy used for floating PV plants is evaluated from the physical performance, safety performance, weather resistance and environmental friendliness.
从物理性能，安全性能，耐候性，环境友好性等方面对水面电站用 HDPE 浮体进行评估。

On-site Production Surveillance and Pre-shipment Inspection 生产监造与出货前检验

By surveillance of production process and inspection before shipment of mounting bracket for PV modules and its components, it could ensure that the products delivered to the power plants are correct with type designation, free from missed plating and the rust during oversea shipping. The inspection includes:

针对光伏组件支架系统及其部件的生产监造和现场检验，以保证交付到电站现场的产品牌号正确，没有漏镀、白锈，以及海运过程中遭受腐蚀形成的红锈。检查包括：

- Visual and Dimension 外观尺寸
- Coating Adhesion 膜层附着力
- Technical Agreement 技术协议要求
- Coating Thickness 镀膜厚度
- Mechanical Properties 力学性能

TÜVNORD

80^{GW}

全球光伏产品及光伏系统评估量
Worldwide PV Product and PV System Performance Evaluation

30⁺

全球市场准入
Global Market Access

150⁺

全球分支
Global Branches

280⁺

全球覆盖区域
Global Regions

400⁺

年度工厂检查
Annual Factory Audit

800⁺

并网认证
Grid-connection

5000⁺

项目总数
Project Amounts

4000⁺

证书签发
Certificates

TÜVNORD

Balance of System (BOS) for Photovoltaic 光伏平衡部件

TÜV NORD Renewable Energy
TÜV NORD 可再生能源



TÜV NORD 可再生能源部

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TÜV®

TÜVNORDGROUP

PV Inverter 光伏逆变器

One-stop Service 一站式服务

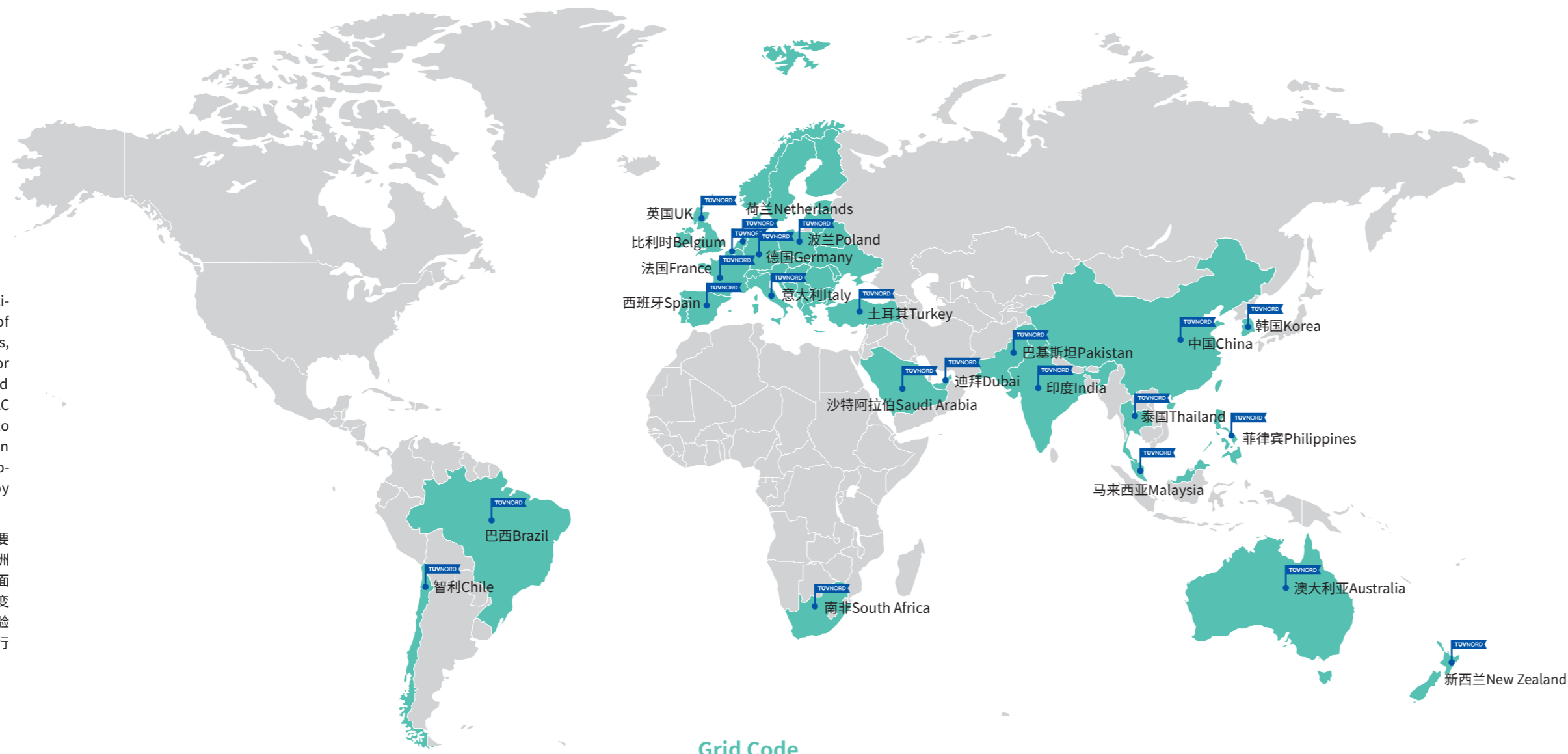
TÜV NORD develops corresponding testing and certification solutions according to the requirements of different regions and national grid access standards, and provides comprehensive certification services for Australia (CEC), Brazil (INMETRO), Thailand (PEA/MEA), especially for the new 1500VDC / 800VAC high-voltage system inverter safety certification to provide a complete set of certification evaluation schemes. Strategic cooperation with many laboratories in China to help customers carries out nearby test certification quickly.

TÜV NORD 根据全球不同地区和国家电网准入标准的要求，从而制定对应的认证标准解决方案，并且提供澳洲 CEC、巴西 INMETRO、泰国 PEA/MEA 等认证列名全面服务，尤其针对新型的 1500VDC/800VAC 高压系统逆变器安全认证提供整套认证评估方案。在国内与众多实验室进行战略合作，实验室遍布全国，助力客户快速进行就近测试认证。

Safety Requirements 安全要求

Product 认证产品	Standard 标准
PV Inverter 光伏逆变器	IEC / EN 62109-1:2010 IEC / EN 62109-2:2011
Power Conversion System 储能变流器	IEC 62477-1:2022/EN 62477-1:2012+A1:2017+A12:2021
Hybrid Inverter 混合逆变器	IEC / EN 62109-1:2010 IEC / EN 62109-2:2011 IEC 62477-1:2022/EN 62477-1:2012+A1:2017+A12:2021

Special Test 特殊测试	Standard 标准
Clearance and Creepage 电气间隙和爬电距离	IEC 60664-3:2016 Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution 低压系统内设备的绝缘协调 - 第 3 部分：用于污染防治的涂层、封装或模型的使用
PVPS Availability 电站逆变器可用度评估	IEC TS 63019:2019 Photovoltaic Power Systems (PVPS) - Information model for availability 光伏发电系统 - 正常运行率的信息模型
Efficiency 转换效率	IEC 61683:1999 / EN 61683:2000 EN 50530:2010 + A1:2013
Environment 环境测试	IEC 60068-2-1:2007 IEC 60068-2-2:2007 IEC 60068-2-14:2009
EMC 电磁兼容	IEC 61000-6-1:2016 / EN IEC 61000-6-1:2019 IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019
	IEC 60068-2-27:2008 IEC 60068-2-30:2005 IEC 60068-2-64:2008 + AMD1:2019
	IEC 61000-6-3:2020 EN IEC 61000-6-3:2021 IEC 61000-6-4:2018 / EN IEC 61000-6-4:2019



Grid Code 并网要求

Countries and Regions 国家和地区	Grid Standard 并网标准
Germany 德国	VDE-AR-N 4105:2018 低压并网 VDE-AR-N 4110:2018 中压并网 VDE-AR-N 4120:2018 高压并网 VDE-AR-E 2510-2:2021
Netherlands 荷兰 Poland 波兰 Turkey 土耳其	EN 50549-1:2019 低压并网 EN 50549-2:2019 中压并网 EN 50549-10:2022
Spain 西班牙	NTS631 UNE 217002:2020 UNE 217001:2020
Europe 欧洲	UTE C15-712-1:2013 NF EN 50549-1:2019 NF EN 50549-2:2019
Italy 意大利	CEI 0-21:2022 低压并网 CEI 0-21, V2(2024) CEI 0-16:2022 中压并网 CEI 0-16, V3(2024)
UK 英国	EREC G98 Issue 1 Amendment 7(2022) EREC G99 Issue 1 Amendment 9(2022)
Belgium 比利时	C10/11:2019 ed2.2

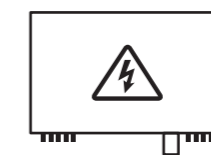
Countries and Regions 国家和地区	Grid Standard 并网标准
Oceania 大洋洲	Australia 澳大利亚 AS/NZS 4777.2:2020 AS/NZS 4777.2:2020 Amd 1:2021 New Zealand 新西兰 AS/NZS 4777.2:2020 AS/NZS 4777.2:2020 Amd 1:2021
South America 南美洲	Brazil 巴西 ABNT NBR 16149:2013 ABNT NBR 16150:2013 ORDINANCE No. 140, OF MARCH 21, 2022 ORDINANCE No.515, OF NOVEMBER 10, 2023 Chile 智利 NTCO:2016 并网
Africa 非洲	South Africa 南非 NRS 097-2-1:2024 ed3.0 SAGC Dubai 迪拜 DEWA DRRG:2016 PEA: 2016 并网：曼谷以外地区 MEA: 2015 并网：曼谷地区
Asia 亚洲	Thailand 泰国 India 印度 IEC 61727:2004 IEC 62116:2014 Korea 韩国 KS C 8565:2015 China 中国 NB/T 32004:2018 GB/T 34120-2017

DC Components 直流部件

According to the different types of DC side balance components in the photovoltaic system, TÜV NORD proposes targeted and differentiated safety certification solutions, so as to help customers promote their products to the global market.

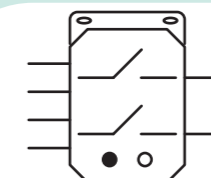
TÜV NORD 针对光伏系统中不同产品类型的直流侧平衡部件，提出了有针对性的差异化安全认证解决方案，助力客户产品更好地推向全球市场。

Testing and Certification 检测与认证



Combiner Box 汇流箱

EN IEC 61439-1:2021+AC:2022-01
EN IEC 61439-2:2021
IEC 61439-1:2020
IEC 61439-2:2020



Rapid Switch 快速关断

PV Module Rapid Switch/MPPT Controller 组件快速开关 / 直流优化器
IEC / EN 62109-1:2010



DC/DC Converter 直流转换器

IEC / EN 62109-1:2010
IEC 62477-1:2022
/EN 62477-1:2012+A1:2017+A12:2021

Safety Requirements 安全要求

Key Items 关键项目	Test Analysis 测试分析
Clearance and Creepage 电气间隙和爬电距离	Scheme evaluation under different input and output operating voltages 不同输入输出工作电压条件下的方案评估
Electrical Ratings Tests 额定电气参数测试	Operating rating of the product in various modes 产品在各种模式下的运行参数
Thermal Test 温升测试	Various inputs and outputs and component temperature rise tests under different environmental conditions 各种不同的输入输出在不同环境条件下的部件温升测试

