



横店东磁股份有限公司光伏组件安装手册

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东磁光伏组件安装说明书

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东磁光伏组件安装说明书

1. 基本信息

首先非常感谢您选用横店东磁股份有限公司光伏组件

本说明提供了横店东磁股份有限公司光伏组件（以下称为“组件”）的安装和安全使用的信息。横店集团东磁股份有限公司以下简称为“东磁”。

安装前，安装者必须阅读和理解本指南。如有任何问题，请联系我们的销售部门，请他们做进一步的解释。安装组件时，安装者应遵守本指南的所有安全防范措施和当地法规。

在安装太阳能光伏发电系统前，安装人员应熟悉此系统的机械和电气要求。本指南请妥善保管，以备将来维护与保养或组件需出售或处理时参考。

2. 安全指南

东磁的组件设计符合规矩 IEC61215 和 IEC61730 标准，应用等级评级为 A 类：组件可用于公众可能接触的、大于直流 50V 或 240W 以上的系统，根据 EN IEC61730-1 和-2 标准，组件质量满足安全要求且安全等级为 II。

2.1 常规安全

- ☆ 安装光伏系统需要专业技术和知识，安装只能由有资质的人员进行，安装人员必须承担所有在安装过程中可能出现的危险，包括但不限于电击危险；
- ☆ 单块组件在阳光直射的条件下可产生超过 30 伏的直流电。与直流电接触有很高的潜在风险，请在任何情况下都避免接触直流电；
- ☆ 光伏组件推荐安装海拔不超过 2000 米；
- ☆ 组件可以安装在地面或屋顶上，系统设计师和安装人员负责支撑结构的合理设计；
- ☆ 安装系统时，须遵守所有当地、地区性和国家级别的法定法规，如有必要，请取得安装许可证；
- ☆ 组件在标准测试条件下，铭牌所标称的电性能参数与实际值有±3%的偏差。（辐照度 1000 W/m²，AM1.5 光谱，电池温度为 25℃（77 °F））；
- ☆ 光伏发电系统只能使用与之相匹配的设备、连接器、接线和支架；
- ☆ 在 183 cm 或更高处作业时必须有防坠落保护措施。遵守职业安全与健康法案（OSHA）或当地有关坠落保护的安全规定（仅 UL）；
- ☆ 请勿坐于、站立于、踩踏或行走于组件之上，包括支架。除自然降雨或者阶段性组件清洗外，请勿将组件的任何部位浸泡在水中或者持续用水冲击组件。

2.2 操作安全

- ☆ 组件在运输和存储过程中，除非组件到达安装地点，否则请不要打开包装；
- ☆ 在组件开箱前，请把包装箱放在通风、防雨和干燥的地方；
- ☆ 运输时，请勿直接施压于组件的背板或玻璃；
- ☆ 不恰当的运输或安装可能损坏组件并使质保无效；
- ☆ 组件要轻拿轻放，请勿抓住组件接线盒或引出线提起组件；请勿使组件掉落或使物体坠落于组件上；请勿在组件上放置任何重物或尖锐物体；
- ☆ 不要拆解组件、移动任何铭牌或黏附的部件；



- ☆ 不要用镜子或透镜聚焦阳光照射到组件上；
- ☆ 请勿在组件玻璃或背板上使用油漆或粘合剂；
- ☆ 为避免损坏背板和电池，请勿刮擦、撞击或使背板产生凹痕；
- ☆ 请勿在边框上钻孔，这可能破坏边框的强度，导致边框生锈并使质保无效；
- ☆ 请勿刮擦支架的阳极处理层（除了组件背面接地连接点的接地连接处），这可能导致边框生锈或破坏边框的强度；
- ☆ 组件破损后将无法修复并可能导致触电，禁止使用已损坏的组件，如已有损坏的玻璃或背板等；
- ☆ 只能在干燥环境中作业，且只能使用干燥的工具，请勿在未佩戴任何保护措施的条件下在潮湿的环境中作业；
- ☆ 如需在户外将未安装的组件存放一段时间，须始终遮盖组件并保证玻璃面向下且置于柔软平面上，防止组件内部积水和连接器的损坏。

2.3 安装安全

- ☆ 请勿在电路有负载的情况下打开电气连接处或拔出连接器；
- ☆ 如果触碰组件带电零部件，例如连接器，无论面板是否已接通，可能导致烧伤、火星和致命电击；
- ☆ 在安装过程中请勿在不必要时触碰组件。玻璃表面和支架可能有产生高温；会产生烧伤和电击危险；

- ☆ 请勿在下雨、下雪或大风天气情况下安装组件；
- ☆ 为防止组件绝缘效果降低，请避免刮擦、切割电缆和连接器或使其长期暴露在阳光下；
- ☆ 运输和安装相关组件时请使儿童远离该系统；
- ☆ 安装时使用不透明材料将组件完全盖住，防止产生电损；
- ☆ 安装或修理光伏系统时请勿佩戴金属戒指、腕表、耳环、鼻环、唇环或其它金属物质；



- ☆ 只能使用符合相关电气安装标准的绝缘工具；
- ☆ 遵守当地的安全规定（例如，关于操作发电站的安全规定）和关于系统其它部件，包括接线和电缆、连接器、充电调节器、逆变器、蓄电池、可充电的电池等的安全规定；
- ☆ 正常情况下，一块光伏组件产生的电流和/或电压可能比标准试验条件下产生的多。因此在计算组件额定电压、额定电流、保险熔断和连接至 PV 输出的控件规格时，应当将标记在该组件上的 I_{sc} 和 V_{oc} 的值乘以 1.25 的系数；
- ☆ 连接组件时只能使用相同型号的连接器的连接到其它设备上，将连接器移除将使质保无效。

2.4 防火安全

- ☆ 咨询您当地的部门获得关于安装或建筑消防安全方面的指导和要求；
- ☆ 根据 IEC61730-2 标准，东磁组件防火等级为 Class C 级；
- ☆ 屋顶安装时，屋顶上必须要覆盖有一层使用该等级的防火材料，并且保证背板与安装面之间充分的通风；
- ☆ 屋顶的结构和安装方式可能会影响建筑的防火安全性能，不恰当的安装可能导致火灾危险；
- ☆ 请根据当地的法规要求，使用恰当的组件配件如保险丝、断路器、接地连接器之类的设备；
- ☆ 请勿在可能产生可燃性气体的环境中或设备附近使用组件。

3. 产品鉴定

每个组件上贴有 2 种标签，提供如下的信息：



东磁光伏组件安装说明书

- 1、铭牌：说明了产品类型，在测试条件下的标准额定功率、额定电流、额定电压、开路电压、短路电流，重量、尺寸、认证标识、最大系统电压等信息；
- 2、条形码：每个单一的组件有一个专属的序列号。该序列号包含该组件的型号、制造时间、对应流水号（客户指定除外），每个组件只有一个条形码。它将永远黏贴在组件内部（黑色检查除外），并且可以从组件正面顶端可以清楚看到，该条形码在层压前就放入的。

4. 机械安装

4.1 场地选择

- ☆ 选择合适的能够接收到最大光强的位置安装组件。
- ☆ 在北半球，组件最好朝南，而在南半球最好朝北。
- ☆ 组件应安装在阳光可以充分照射的位置，并确保在任何时间内不被遮挡。
- ☆ 组件极限工作环境温度在 -40°C 到 85°C ，我们推荐组件安装在工作环境温度为 -20°C 到 40°C 的环境下，该工作环境温度为安装地点的月平均最低温度和最高温度。
- ☆ 东磁的组件通过了 IEC61701 的盐雾腐蚀测试，但腐蚀可能发生在边框与支架连接的部位，或者接地连接的部位。东磁推荐组件安装在海边的时候，组件安装在距离海岸线 500m 以上，近海安装需与东磁确认，取得认可后安装。
- ☆ 组件不能再冰雹、积雪、风沙、烟尘、空气污染、煤烟等过量的环境中安装和使用，组件不能安装在有强烈腐蚀性物质如：盐、盐雾、盐水、活跃的化学蒸汽、酸雨、或者有其它任何会腐蚀组件，影响组件安全或者性能的物质地方
- ☆ 不要把组件放置在易产生或聚集可燃气体的地方。

4.2 倾角选择

太阳能组件的倾斜角指的是组件表面与地平面之间的夹角，组件正对着阳光时，会获得最大的输出功率。

要了解最佳的安装倾斜角的详细信息，请参考标准太阳能光伏安装指南或咨询可靠的太阳能系统安装公司。

东磁建议组件安装的时候夹角不小于 10° 度，这样组件在下雨的时候表面灰尘容易被雨水带走，减少组件的清洗频率，有利于表面积水流走，避免长期大量积水在玻璃上留下痕迹，从而影响组件的外观和性能。

4.3 常规要求

- ☆ 组件的支撑结构必须由耐用、防锈和抗紫外材料构成。
- ☆ 确保组件安装方式和支架系统足够坚固，使组件可以承受所预定的载荷条件，请使用经检测和认证批准的支撑结构。
- ☆ 在冬天有大量降雪的地区，请选择合适的支撑系统高度，使组件最低边缘在任何时候都不会被雪覆盖。另外，请保证组件最低部分放置的高度足够，使植物、树木不会遮挡住阳光。
- ☆ 对于地面安装系统，我们建议地面离组件底部的最小距离至少为 60 厘米。
- ☆ 组件必须稳固放置在支撑结构上。例如使用夹带夹具的安装方式，请遵守夹具系统供应商的说明。
- ☆ 根据您当地的规定为组件底部提供充足的通风。屋顶平面与组件的支架之间通常建议应有最少 10 厘米的距离。
- ☆ 应避免边框收到侧向拉力和压力，避免边框脱开或挤碎玻璃；
- ☆ 将组件安装于屋顶前，请确保屋顶的结构合理。另外，任何需要安装组件的屋顶必须密封处理防止漏水。
- ☆ 两个组件间的距离建议最少为 1 厘米，防止热膨胀产生的损坏。
- ☆ 将组件安装于立柱上时，选择的立柱和组件支撑结构必须可以承受当地可能的风载荷和雪载荷。确保组件不会承受超过最大允许载荷的风载和雪载，而且不会承受支撑结构热膨胀产生力。不允许组件重叠或者超出屋顶。请参考下列安装方式获得详细信息。

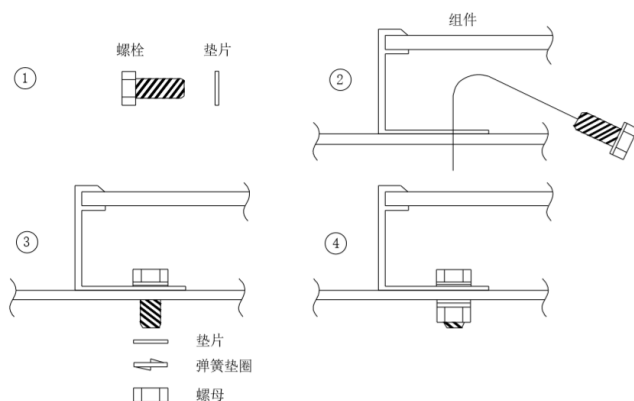
4.4 安装方式

1、安装孔安装

通过组件背面边框上的安装孔，使用螺栓将组件固定在支架上。每个组件的边框上都有 4 个安装孔，通过这些安装孔可以很好的将组件固定到支撑结构上以优化其负载承受能力。

为了最大限度地延长安装寿命，强烈建议使用抗腐蚀（不锈钢）固定件，紧固时扭矩建议保持在 15-20 N·m，安装细节如下图所示：

螺旋	垫圈
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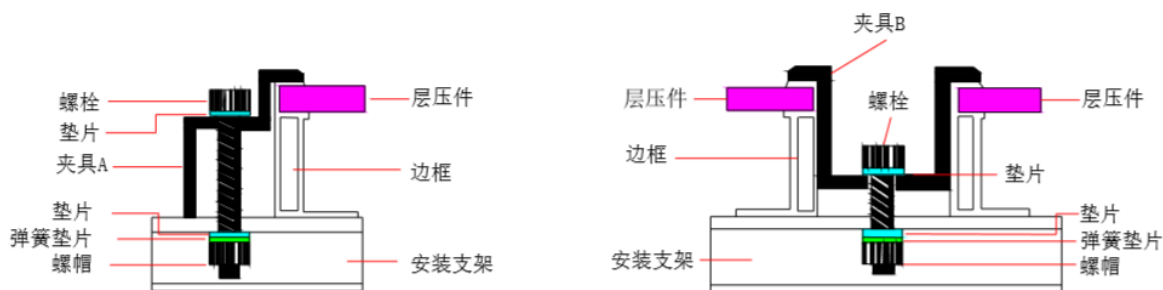


材质：不锈钢 尺寸：M8*20mm	材质：不锈钢 尺寸：M8 厚度：≥1.6mm
弹簧垫圈	螺母
材质：不锈钢 尺寸：M8 厚度：≥2.0mm	材质：不锈钢 尺寸：M8

2、夹具安装

当选择夹具安装方法时，每个组件上至少需要使用四个夹具。在组件的每个长边（纵向）或每个短边（横向）上各安装两个夹具。视当地的风雪气象情况确定是否需要额外的夹具以确保组件能承受负载。每个夹具最小建议长度为 50mm，施加的扭矩应按照客户所用螺栓的机械设计标准来定，例如：
M8 ---- 18-24N.m。



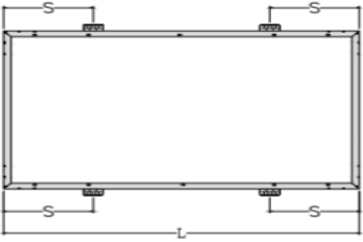
任何情况下，组件夹具不能和前侧的玻璃接触，且不得使边框变形，请务必避免组件夹具的遮光效应，安装细节如下图所示：


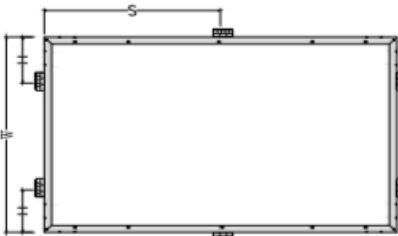
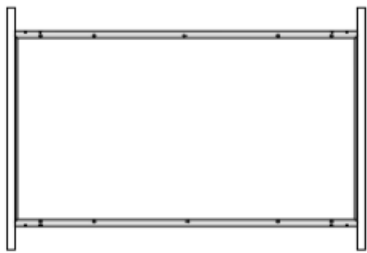
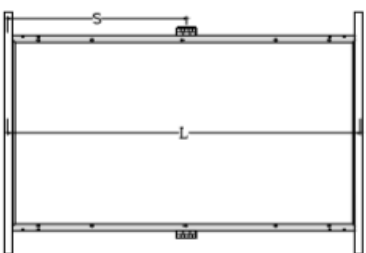


4.5 安装指南

低的/正常水平的载荷情况, 适用于大部分的环境条件: 组件正面最大承受载荷 2400Pa, 背面为 2400Pa, 组件正面能够承受最大设计压力为 1600Pa, 背面为 1600Pa, 安全系数 1.5;

较高载荷条件, 适用于苛刻的环境条件(如风暴、大雪等)：组件正面最大承受载荷 5400Pa, 背面为 2400Pa, 组件正面能够承受最大设计压力为 3600Pa, 背面为 1600Pa, 安全系数 1.5。

安装手册	最大测试载荷: 正面2400Pa, 背面2400Pa 最大设计载荷: 正面1600Pa, 背面1600Pa	安装手册	最大测试载荷: 正面5400Pa, 背面2400Pa 最大设计载荷: 正面3600Pa, 背面1600Pa
螺栓安装	 使用4个安装孔	螺栓安装	 使用8个安装孔
夹具在长边框安装		夹具在长边框安装	 安装夹允许位置 $(1/4L-50) < S < (1/4L+50)$

安装手册	最大测试载荷: 正面1600Pa, 背面1600Pa 最大设计载荷: 正面1067Pa, 背面1067Pa	安装手册	最大测试载荷: 正面5400Pa, 背面2400Pa 最大设计载荷: 正面3600Pa, 背面1600Pa
夹具在短边框安装	 安装夹允许位置 $0 < H < 1/4W$	夹具在短边框安装	 安装夹允许位置 $(1/2L-50) < S < (1/2L+50)$ $0 < H < 1/4W$
			允许使用夹具装配 $(1/2L-50) < S < (1/2L+50)$ $0 < H < 1/4W$
嵌入式安装			

5. 电气安装

- ☆ 任何所使用的安装附件必须在材料上相互兼容，避免电化学腐蚀。由于腐蚀引起的故障将导致质保无效。
- ☆ 不建议在同一个系统中使用配置不同的组件。
- ☆ 必须将多余的电缆整理或充分固定，例如，使用非金属绑线将其固定在支架上。组件电缆线、连接器和接线盒不应长时接触水、雨雪或浸泡于水中 (IP65/67/68)。
- ☆ 对于需要高操作电压的应用而言，可以将多个组件串联形成组件串；系统电压即等同于每个组件的电压的总和。
- ☆ 对于需要高操作电流的应用而言，可以将多个组件串并联；系统电流即等同于每个组件串的电流总和。
- ☆ 根据标准，组件的最大系统电压为600伏或1000伏或1500伏。
- ☆ 串联连接的组件最大数目由系统设计、所用的逆变器类型和环境条件决定。
- ☆ 根据组件最大串联保险丝额定值和当地电气安装规范，如果光伏组件并联，需要装配合适的串保险丝。对于并联连接的组件没有数量上的特殊限制，组件的数量由系统设计参数，例如电流或功率输出决定。
- ☆ 为防止电缆和连接器过热，必须选择适合系统最大短路电流的电缆线和连接器。推荐电缆是横截面至少4mm²的光伏电缆线。
- ☆ 注意：请勿让电缆线承受过大压力。任何由于电缆线连接导致的损坏不在东磁的质量保证范围内。
- ☆ 请参考当地规定来决定系统的接线尺寸、类型和温度。
- ☆ 东磁组件在供货时配有用于系统电气连接的连接器，东磁强烈建议使用东磁产品数据表中规定的型号的连接器的正品。
- ☆ 为了确保可靠的电气连接并防止可能进入潮气，当两个连接器相互对接时，必须锁住直到听见咔哒声。
- ☆ 长期暴露于潮湿环境中可能导致连接器连接性变差，导致漏电和较差的传导性，这将会使质保无效。东磁建议对连接器/电缆/接线进行适当的管理以防止湿气进入。根据湿气严重程度，东磁建议定期检查安装系统，保证组件的良好性能。
- ☆ 光伏系统产生的直流电可以被转化成交流电，并用于公共电网中。由于各地区机构关于将可再生的能源系统接入电网的政策各不相同，请始终向有资质的系统设计师或集成商咨询相关建议。通

常需要安装许可证和当地机构进行检查和批准。

☆ 对于较大规模的安装，东磁建议采用符合当地要求和规定的防雷法。

6. 接地

组件的设计中，使用了阳极氧化的抗腐蚀的铝合金边框作为刚性支撑，为了使用安全，避免组件受到雷电和静电伤害，组件边框必须接地。

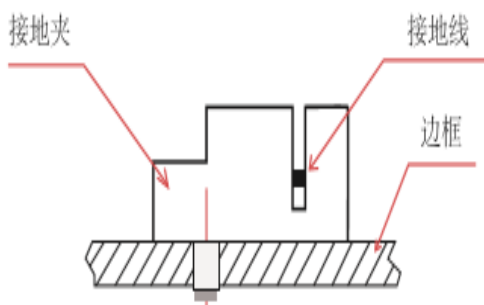
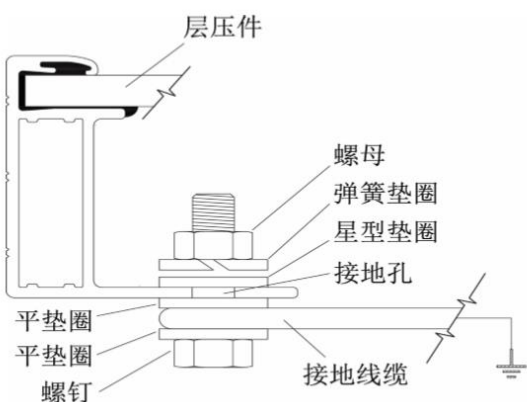
边框上已预先钻孔并标记上接地标志，这些洞只用于接地，不能用于安装组件。

我们建议始终参考当地和国家有关光伏组件接地的规范和要求。如果当地机构允许，东磁强烈建议使用负极接地。

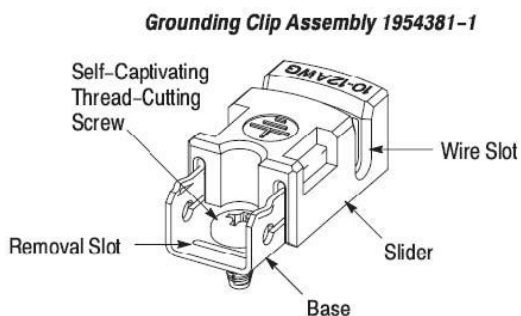
必须将支架接地硬件和接线安装到支架上所标注的合适的接地标志位置以确保合适的电气连接。

东磁推荐使用下述一种接地零件：

1) 如下左图所示，使用M8螺栓、垫圈在边框预留接地孔处将接地线缆与边框连接固定并形成导通，螺母拧紧力矩为3-7 N·m。螺母、垫圈均使用不锈钢材质，接地线推荐使用4-14 mm² (AWG6-12) 外露铜线。



2) 使用接地夹具接地，如上右图所示，接地夹包含一个滑触头、底座和车削自攻螺丝或 8-32 螺栓和六角螺母。接地夹可容纳规格为 10-12AWG 的裸铜线。



我们推荐客户采用SolKlip公司型号为1954381 - []的接地夹，出于安全考虑，该接地配件应用于金属边框光伏组件。

3) 其它的第三方接地装置

东磁组件可以使用第三方的接地装置接地，但其接地必须是可靠有证明的，接地装置是根据制造商要求的规定操作。

7. 维护及保养

组件需要进行定期的检查和维护，特别是在保修期间内。为了确保组件能达到最佳性能，东磁建议采用以下维护措施：必要时，清洁组件的玻璃表面。要用软海绵或者是抹布沾水清洁。

7.1 外观检查

请仔细检查组件是否存在外观缺陷。重点观察以下几点：

- ☆ 光伏组件使用减反射膜技术，若在不同角度下观察组件发现存在颜色差异，这属于正常现象
- ☆ 组件玻璃是否有破损；
- ☆ 是否有尖锐物体接触组件表面；
- ☆ 组件是否被障碍物、异物遮挡；
- ☆ 电池片栅线附近是否有腐蚀情况。这种腐蚀情况是由于组件表面封装材料在安装或运输过程中遭到 破损，导致水汽渗透到组件内部所造成；
- ☆ 观察组件背板是否有烧穿的痕迹；
- ☆ 检查组件与支架间的固定螺丝是否有松动或损坏，并进行及时调整或修复。

7.2 清洗

- ☆ 必要时，清洁组件的玻璃表面。要用软海绵或者是抹布沾水清洁
- ☆ 可使用温和的，不加研磨剂的清洗剂去除顽垢。
- ☆ 为了减少潜在的电击或灼伤，东磁建议在光照不强且组件温度较低的清晨或傍晚时进行光伏组件的 清洁工作，特别是对于气温较高的地区；
- ☆ 不要试图清理有玻璃破损或存在裸露电线等特征的光伏组件，这都将有受到电击的危险。
- ☆ 切勿使用化学品清洁组件，可能会影响组件维修和功率输出。



东磁光伏组件安装说明书

7.3 连接器和电缆线的检查

推荐每六个月进行一次以下的预防性维护：

- ☆ 检查接线盒的密封胶，确保没有裂纹或缝隙；
- ☆ 检查连接器的密封性和电缆连接是否牢固，检查组件是否接地良好。

如有任何疑问，请具有资质的人员进行检查。注意遵守系统使用的所有部件，如支架、充电整流器、逆变器、电池等的维护说明。

8. 免责声明

由于本手册的使用及光伏（PV）产品安装、操作、使用和维护的条件或方法超出了东磁的控制范围，东磁不对任何与这些安装、操作、使用或维护相关的操作所引起的损失、破坏或费用负责。

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DMEGC Photovoltaic Modules Installation Manual

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1. General Information

Thanks for choosing DMEGC Solar PV modules.

This guide contains information regarding the installation and safe handling of DMEGC photovoltaic module (hereafter is referred to as “module”).

All instructions should be read and understood before attempting to install. If there are any questions, please contact our sales department for further explanation. The installer should conform to all the safety precautions in the guide when installing the module. Local codes should also be followed in such installation.

Before installing a solar photovoltaic system, the installer should become familiar with the mechanical and electrical requirement for such a system. Keep this guide in a safe place for further reference (care and maintenance) and in case of sale or disposal of the module.

2. Safety precautions

DMEGC solar Modules are designed to meet the requirements of IEC 61215 and IEC 61730, application class A, Modules rated for use in this applications class may be used in system operating at greater than 50V DC or 240W, where general contact access is anticipated Modules qualified for safety through IEC 61730-1 and IEC 61730-2 and within this application class are considered to meet the requirements for safety class II equipment.

2.1 General Safety

- ⌋ Installing solar photovoltaic systems requires specialized skills and knowledge.
- ⌋ Installation must only be performed by authorized and trained personnel. Installers must assume all risks of injury that might occur during installation, including, but not limited to, the risk of electric shock.
- ⌋ One single module may generate more than 30V DC when exposed to direct sunlight. Contact with a DC voltage is potentially hazardous and should be always avoid.
- ⌋ PV modules are recommended to be installed at altitudes of less than 2000m.
- ⌋ Modules can be ground mounted, mounted on rooftops. The proper design of support structures lies within the responsibility of the system designers and installers.
- ⌋ When installing the system, abide to all local, regional and national statutory regulations. Obtain a

building permit if necessary.

- ⌈ The electrical characteristics are within ± 3 percent of the indicated values of I_{sc} , V_{oc} and P_{max} under standard test conditions (irradiance of 1000 W/m^2 , AM 1.5 spectrum, and a cell temperature of 25°C (77°F)).
- ⌈ Only use equipment, connectors, wiring and support frames suitable for solar electric systems.
- ⌈ Always use fall protection equipment when working from heights of 6 feet (183cm) or above. Follow Occupational Safety and Health Act (OSHA) or local governing safety regulations regarding Fall Protection. (UL Only) .
- ⌈ Do not sit, stand, step or walk on any side of the module, including the frames. Do not permit any part of the module(s) to be submerged or allow for constant water to soil the module(s) unless it's natural rain fall or periodic cleaning.

2.2 Operating safety

- ⌈ Do not open the package of DMEGC Solar Modules during transportation and storing until they are ready to be installed.
- ⌈ Store pallets in a ventilated, rain-proof and dry location until the Modules are ready to be unpacked.
- ⌈ During the transportation, do not to apply direct pressure on the backsheet or front glass.
- ⌈ Inappropriate transport and installation may break the module and void the warranty.
- ⌈ Do not lift the module by holding the module's junction box or electrical leads. Do not place any heavy or sharp objects on the module.
- ⌈ Do not attempt to disassemble the modules, and do not remove any attached nameplates or components from the modules.



- ⌈ Do not use mirrors, other magnifiers or artificially concentrated sunlight onto the modules.
- ⌈ Do not apply paint or adhesive to the module top surface or backsheet.
- ⌈ To avoid damage to the backsheet and cells, do not scratch, dent or hit the backsheet.
- ⌈ Do not drill holes in the frame. This may compromise the frame strength, cause corrosion of the frame and void the warranty.
- ⌈ Do not scratch the anodized coating of the frame (except for grounding connections at the grounding connection point on the back side of the module). It may cause corrosion of the frame or compromise

the frame strength.

- ⌈ A module with broken glass or torn backsheet cannot be repaired and must not be used since contact with any module surface or the frame can cause an electric shock.
- ⌈ Work only under dry conditions, and use only dry tools. Do not handle modules under wet conditions unless wearing appropriate protective equipment.
- ⌈ When storing uninstalled modules outdoors for any period of time, always cover the modules and ensure that the glass faces down on a soft flat surface to prevent water from collecting inside the module and causing damage to exposed connectors.

2.3 Installation safety

- ⌈ Never disconnect electrical connections or unplug connectors while the circuit is under load.
- ⌈ Contact with electrically active parts of the modules, such as terminals, can result in burns, sparks and lethal shock whether or not the module is connected.
- ⌈ Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot; there is a risk of burns and electric shock.
- ⌈ Do not work in the rain, snow or in windy conditions.
- ⌈ Avoid exposing cables and connectors to direct sunlight and scratches or cuts in order to prevent insulation degradation.
- ⌈ Keep children well away from the system while transporting and installing mechanical and electrical components.
- ⌈ Completely cover the module with an opaque material during installation to prevent electricity from being generated.
- ⌈ Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic devices while installing or troubleshooting photovoltaic systems.



- ⌈ Use only insulated tools that are approved for working on electrical installations.
- ⌈ Follow the safety regulations (e.g., safety rules for working on electrical power plant stations) of your regions and for all other system components, including wires and cables, connectors, charging regulators, inverters, storage batteries, rechargeable batteries, etc.
- ⌈ Under normal conditions, a photovoltaic module is likely to experience conditions that produce more

current and/or voltage than reported at standard test conditions. Accordingly, the values of I_{sc} and V_{oc} marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, minimum factor of fuse sizes, and size of controls connected to the PV output.

- ⌋ Only use same connectors to connect modules to form a string, or connect to another device. Removing the connectors will void the warranty.

2.4 Fire Safety

- ⌋ Consult your local authority for guidelines and requirements for building or structural fire safety.
- ⌋ According to IEC 61730-2 standard, DMEGC modules have been rated Fire Class C, and are suitable for mounting on to a Class A roof.
- ⌋ For roof installations, modules should be mounted over a fire resistant covering suitable for this application, with adequate ventilation between the module backsheet and the mounting surface.
- ⌋ Roof construction and installation may affect the fire safety of the building, Improper installation may create hazards in the event of a fire.
- ⌋ Use appropriate components such as fuses, circuit breakers and grounding connectors as requires by local authority.
- ⌋ Do not use modules near equipment or in locations where flammable gases may be generated or collected.

3. Product identification

Each module has two labels providing the following information:

1. Nameplate: describes the product type; rated power, rated current, rated voltage, open circuit voltage, short circuit current, all as measured under standard test conditions; weight, dimensions, the maximum system voltage etc.;
2. Barcode: each single module has a unique serial number. The serial number contains the model number, manufacturing time, and corresponding serial number of the module (except for customer designation), Each module has only one barcode. It is permanently attached to the interior of the module(except the whole black modules), is visible from the top front of the module. This bar code is inserted prior to laminating.

4. Mechanical Installation

4.1 Selecting the location

- ⌋ Select a suitable location for the module installation, where they receive maximum sunlight throughout the year.
- ⌋ The module must be facing true south in northern latitudes and true north in southern latitudes.
- ⌋ The module should not be shaded at any time of the day.
- ⌋ The recommended ambient temperature should be within -20°C to 40°C, the temperature limits are defined as the monthly average high and low of the installation site, the limit operating temperature should be -40°C to 85°C.
- ⌋ DMEGC Solar Modules have passed the IEC61701 salt-mist, but galvanic corrosion can occur between the aluminum frame of the Modules and mounting or grounding hardware if such hardware is comprised of dissimilar metals. When DMEGC recommends that the module be installed at the seaside, the module should be installed more than 500m away from the coastline. Confirm with DMEGC, install after obtaining approval.
- ⌋ Modules must be installed or operated in areas where salt, hail, snow, sand, dust, air pollution, chemically active, acid rain, soot, etc., are excessive. Modules must be sited in locations where aggressive substances such as salt or salt-water, or any other type of corrosive agent, could affect the safety and/or performance of the modules.
- ⌋ Do not use module near equipment or in locations where flammable gases can be generated or collected.

4.2 Tilt Angle Selection

The tilt angle of the PV module is measured between the surface of the PV module and a horizontal ground surface. The PV module generates maximum output power when it faces the sun directly.

For detailed information on the best elevation tilt angle for the installation, refer to standard solar photovoltaic installation guides or a reputable solar installer or systems integrator.

Dust building up on the surface of the modules can impair

Module performance. DMEGC solar recommends installing the modules with a tilt angle of at least 10 degrees, making it easier for dust to be washed off by rain.

4.3 conventional requirements

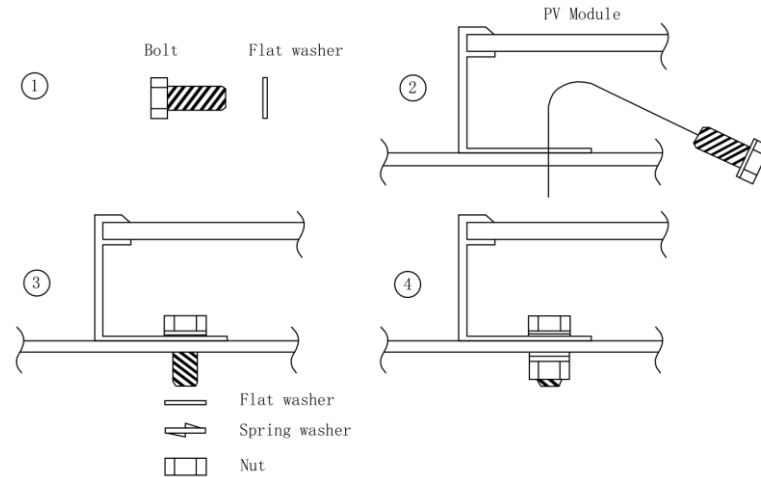
- ⌈ The module mounting structure must be made of durable, corrosion-resistant and UV-resistant material. Always use a tested and certified mounting structure approved for your system design.
- ⌈ Ensure the installation method and supporting system of modules is strong enough to withstand all the load conditions. Always observe the instructions and safety precautions included with the module support frames.
- ⌈ In regions with heavy snowfall in winter, select the height of the mounting system so that the lowest edge of the module is not covered by snow for any length of time. In addition, ensure that the lowest portion of the module is placed high enough so that it is not shaded by plants, trees or damaged by ground soil moved by or through the air.
- ⌈ For ground mounting systems, the minimum distance DMEGC recommend from the ground to the bottom of the module is at least 24 inches (60cm).
- ⌈ Modules must be securely attached to the mounting structure. For example using Clamping System installation methods, please follow the instruction of the clamping system supplier.
- ⌈ Provide adequate ventilation under the modules in conformity to your local regulations. A minimum distance of 10 cm between the roof plane and the frame of the module is generally recommended.
- ⌈ Avoid the frame receiving the lateral tension and pressure, causing the frame off or crushing the glass.
- ⌈ Before installing modules on a roof, always ensure the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
- ⌈ Observe and take into account the linear thermal expansion of the module frames (the recommended minimum distance between two modules is 1 cm).
- ⌈ When installing a module on a pole, select a pole and module mounting structure that will withstand the anticipated wind load and snow load for the area.
- ⌈ Ensure modules are not subjected to wind or snow loads exceeding the maximum permissible loads, and are not subject to excessive forces due to the thermal expansion of the support structures. Never allow modules overlap or exceeds the rooftop: Refer to the following installation methods for more detailed information.

4.4 Installation methods

1. Mounting with Bolts

Modules can be attached through the mounting holes on the back frame of the module, by fixing the module to the support rails with bolts. The frame of each module has 4 mounting holes, ideally placed to optimize the load handling capability, to secure the modules to supporting structure.

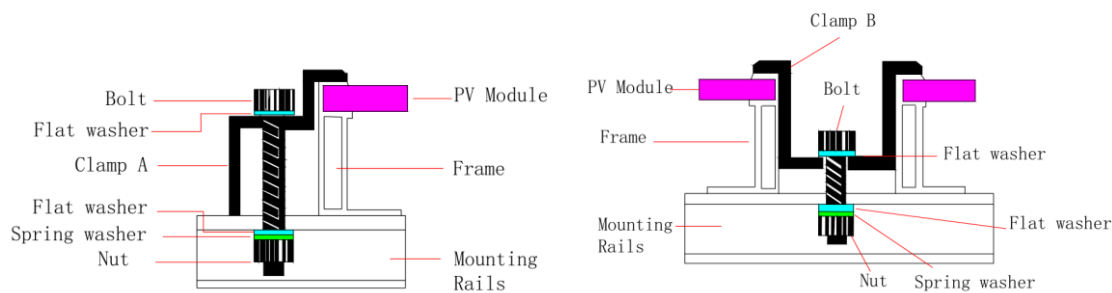
To maximize mounting longevity, DMEGC strongly recommends the use of corrosion proof (stainless steel) attachment hardware. The tightening torque (suggest stainless steel M8 bolts) should be around 15-20 N·m, the mounting details are shown in the following figures:



2. Mounting with Clamps

When choosing this type of clamp-mounting method, use at least four clamps on each module, two clamps should be attached on each long sides of the module (for portrait orientation) or each short sides of the module (for landscape orientation). Depending on local wind and snow loads, additional clamps may be required to ensure that modules can bear the load.

Modules clamps should not come into contact with the front glass and must not deform the frame. Be sure to avoid shadowing effects from the module clamps. The mounting details are shown in the following figures.

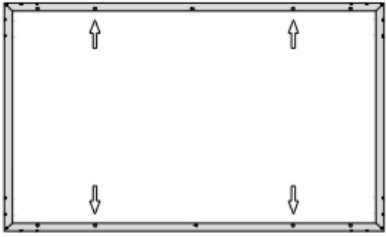
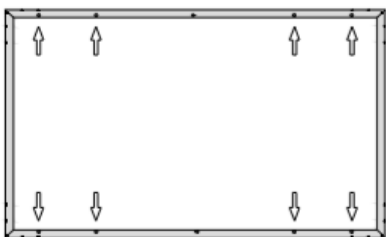


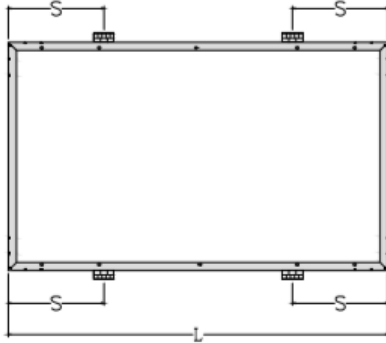





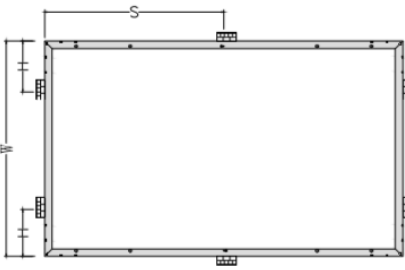
4.5 Attachment guidelines

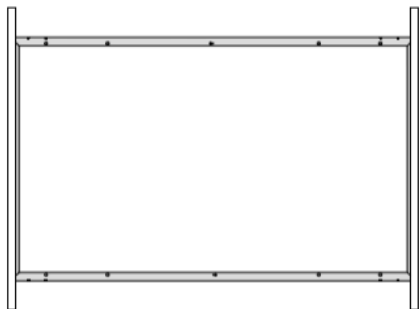
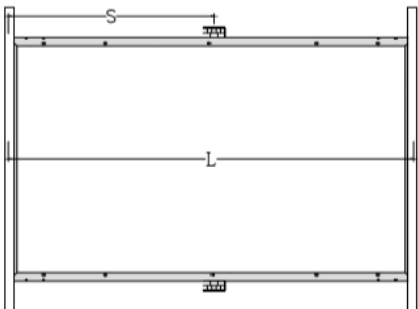
The Standard/lower loading capacity applies to normal environment : the modules are tested under a maximum positive pressure of 2400 Pa, and negative pressure of 2400 Pa, the modules are designed to meet a maximum positive pressure of 1600Pa, and negative pressure of 1600 Pa, this design load was then tested with a safety factor of 1.5 times.

The high loading capacity applies to severe environment, like storm, big snow, etc: the modules are

tested under a maximum positive pressure of 5400 Pa, and negative pressure of 2400 Pa, the modules are designed to meet a maximum positive pressure of 3600Pa, and negative pressure of 1600 Pa, this design load was then tested with a safety factor of 1.5 times.

Installation manual	Test Load: positive2400Pa/negative2400Pa Design Load: positive1600Pa/negative1600Pa		Test Load: positive5400Pa/negative2400Pa Design Load: positive3600Pa/negative1600Pa
Mounting with Bolts	 use 4 mounting holes	Mounting with Bolts	 use 8 mounting holes
	 Allowed assembly with clamp ($1/4L-50$)< S <($1/4L+50$)		 Allowed assembly with clamp ($1/4L-50$)< S <($1/4L+50$)
Assemble on the long side with clamp		Assemble on the long side with clamp	

Installation manual	Test Load: positive1600Pa/negative1600Pa Design Load: positive1067Pa/negative1067Pa		Test Load: positive5400Pa/negative2400Pa Design Load: positive3600Pa/negative1600Pa
	 Allowed assembly with clamp $0 < H < 1/4W$		 Allowed assembly with clamp $0 < H < 1/4W$
Assemble on the long side with clamp		Assemble on the long side with clamp	

Installation manual	Test Load: positive1600Pa/negative1600Pa Design Load: positive1067Pa/negative1067Pa	Test Load: positive5400Pa/negative2400Pa Design Load: positive3600Pa/negative1600Pa
Module installation by inserting		<p>Allowed assembly with clamp $(1/2L-50) < S < (1/2L+50)$ $0 < H < 1/4W$</p> 

5. Electrical Installation

- Any hardware used must be compatible with any other used material to avoid galvanic corrosion. Defects caused by corrossions void the warranty.
- It is not recommended to use modules with different configurations (grounding, wiring) in the same system.
- Excessive cables must be organized or fixed in an adequate way, e.g. attached to the mounting structure by using non-metallic cable ties. Solar cables, connectors and junction boxes should not be exposed to water exposure, and snow, and rain or water submersion for a long period of time(IP65/67/68).
- For applications requiring high operating voltage several modules can be connected in series to form a string of modules; the system voltage is then equal to the sum of the voltage of each module.
- For applications requiring high operating currents several strings of modules can be connected in parallel; the system current is then equal to the sum of the current of each string of modules.
- The maximum system voltage is 600 volts, 1000 volts or 1500 volts depending on the product family DC according to standards.
- The maximum number of series connected modules depends on system design, the type of inverter used and environmental conditions.
- Based on the maximum series fuse rating of module and local electrical installation code, always make sure DMEGC PV modules are assembled with the appropriate string fuse for circuit protection. There is no specific limitation on the number of modules that can be connected in parallel, the number

of modules is determined by system design parameters such as current or power output.

- ⌋ To prevent the cables and the connectors from overheating, the cross section of the cables and the capacity of the connectors must be selected to suit the maximum system short circuit current. The recommended cable is PV wire with a cross section of at least 4mm².
- ⌋ Caution: do not secure the cables too tight. Any cable damage caused by cable management system is not covered under DMEGC's warranty.
- ⌋ Always refer to the cable manufacturer's bending radius which includes the radius just behind the connectors.
- ⌋ DMEGC modules are supplied with connectors used for system electrical connections. We strongly recommends using the genuine connector type specified by DMEGC's product data sheet. Any choice of a different connector type other than specified may void the warranty of the module.
- ⌋ To ensure reliable electric connection and to prevent possible intrusion of humidity, two connectors must be mated and locked together until a click can be heard.
- ⌋ Long-term exposure to wet environments may cause connectors' poor connectivity, resulting in current leakage and poor conductivity which voids the warranty. DMEGC recommends proper connector/cable/wire management to prevent moisture intrusion. Depending on the amount of humidity, DMEGC recommends periodic inspections of the installation system to maintain optimal module performance.
- ⌋ The DC current generated by photovoltaic systems can be converted into AC and fed into a public Grid. As local utilities' policies on connecting renewable energy systems to the Grids vary from region to region. Always seek the advice from a qualified system designer or integrator. Building permits, inspections and approvals by the local utility are generally required.
- ⌋ Especially for larger installations DMEGC recommends lightning protection following the local requirements and regulations.

6. Grounding

For grounding and bonding requirements, please refer to regional and national safety and electricity standards. If grounding is required, use a recommended connector type for the grounding wire.

DMEGC PV Modules use an anodic oxidized aluminum frame to resist corrosion, so the frame of Modules should be connected to the equipment grounding conductor to prevent thunder and electrical shock.

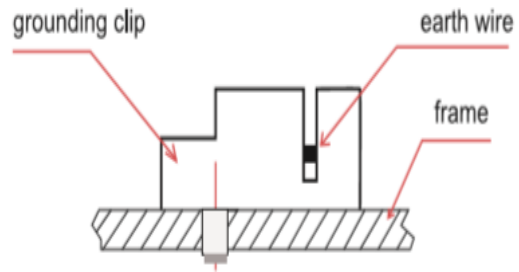
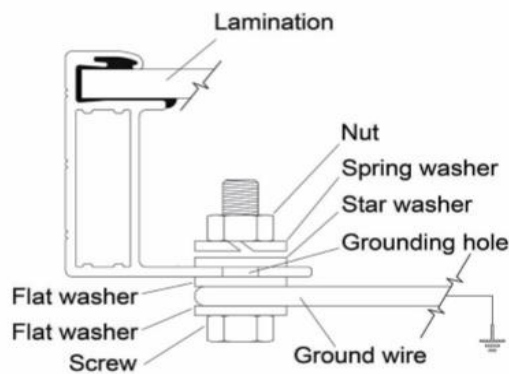
The frame rails have pre-drilled holes marked with a grounding sign, these holes should be used for grounding purposes and should not be used for mounting the Modules.

We recommends always refer to local state and national code requirements for PV module grounding. DMEGC highly recommends negative grounding if it's allowed by local authorities.

When attaching the frame grounding hardware and wire to the frame it must be placed corresponding to the ground symbol stamped location to ensure proper electrical connection.

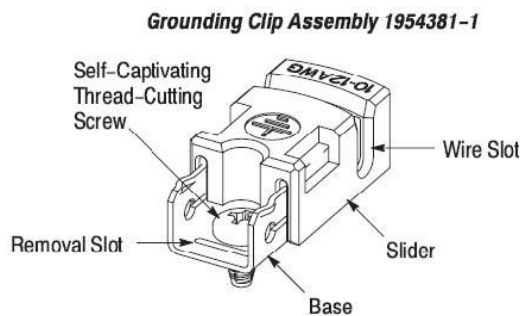
DMEGC recommends one of the following parts for grounding:

1) Use M8 bolt and washer to bond the ground wire and aluminum frame through the grounding hole (as shown below left). The tightening torque is 3-7Nm. All nuts and washers should be made of stainless steel. 4-14 mm² (AWG 6-12) exposed copper wire is recommended as ground wire.



2) Grounding by using grounding clamp

The grounding clip assembly consists of a slider, base, and self-captivating thread-cutting screw or 8-32 screw and hex nut. The grounding clip accepts solid uninsulated copper wire sizes 10 or 12 AWG.



We recommend customers use SolKlip Grounding Clip Assemblies 1954381-[]; SolKlip Grounding Clip Assemblies 1954381-[] are used with metal-framed photovoltaic (solar) panels and related products that require grounding for safety reasons.

3) Addition Third-party Grounding Devices

DMEGC PV Modules can be grounded using third party grounding devices so long as they are certified for grounding modules and the devices are installed according to the manufacturer's specified instructions.

7. Maintenance and care

It is required to perform regular inspection and maintenance of the modules, especially during the warranty period. To ensure optimum module performance, DMEGC recommends the following maintenance measures:

7.1 Visual Inspection

Inspect the modules visually to find if there are any visual defects, If there are, the following items should be evaluated:

- └ If modules are observed having slight cell color differences at different angles, this is a normal phenomenon of modules with anti-reflection coating technology.
- └ Whether the glass is broken.
- └ No sharp objects are in contact with the PV module surfaces.
- └ PV modules are not shaded by unwanted obstacles and; or foreign material.
- └ Corrosion along the cells' bus-bar. The corrosion is caused by moisture intrusion through the module back sheet. Check the back sheet for damage.
- └ Check whether the back sheet is burnt. g) Check if screws and mounting brackets are tight, adjust and tighten as necessary.

7.2 Cleaning

- └ Clean the glass surface of the module as necessary. Always use water and a soft sponge or cloth for cleaning.
- └ A mild, nonabrasive cleaning agent can be used to remove stubborn dirt.
- └ In order to reduce the potential for electrical and thermal shock, DMEGC recommends cleaning PV modules during early morning or late afternoon hours when solar radiation is low and the modules are cooler, especially in regions with hotter temperatures.
- └ Never attempt to clean a PV module with broken glass or other signs of exposed wiring, as this presents a shock hazard.
- └ Never use chemicals when cleaning modules as this may affect the module warranty and energy output.

7.3 Inspection of Connector and Cable

It's recommended to implement the following preventive maintenance every 6 months:

- └ Check the sealing gels of the junction box for any damage.
- └ Examine the PV module(s) for signs of deterioration. Check all wiring for possible rodent damage, weathering and that all connections are tight and corrosion free. Check electrical leakage to ground.

If any problem arises, consult a professional solar service provider for suggestions. Caution: observe solar manufacturers' maintenance instructions for all components used in the system, such as support frames, charging regulators, inverters, batteries etc.

8. Disclaimer of liability

Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) product are beyond DMEGC's control, DMEGC does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.

No responsibility is assumed by DMEGC for any infringement of patents or other rights of third parties, which may result from use of the PV product. No license is granted by implication or otherwise under any patent or patent rights.

The information in this manual is based on DMEGC's knowledge and experience and is believed to be reliable; but such information including product specification (without limitations) and suggestions do not constitute a warranty, expresses or implied. DMEGC reserves the right to change the manual, the PV produce, the specifications, or product information sheets without prior notice.

Appendix:

Group 1 (60 156.75 cells modules xxx=210~325,in increment of 5)			
DMxxx-M156-60	DMxxx-M156-60BK	DMxxx-M156-60P	DMxxx-M156-60S
DMxxx-M156-60BKS	DMxxx-M156-60UB	DMxxx-M156-60L	DMxxx-M156-60BL
DMxxx-M156-60LS	DMxxx-P156-60	DMxxx-P156-60BK	DMxxx-P156-60S
DMxxx-P156-60BKS	DMxxx-P156-60L	DMxxx-P156-60BL	DMxxx-P156-60LS
DMxxxM2-60SW	DMxxxM2-60BB	DMxxxM2-60SW-S	DMxxxM2-60BB-S
DMxxxM2-60BU	DMxxxM2-60SW-L	DMxxxM2-60BW-L	DMxxxM2-60SW-LS
Group 2 (72 156.75 cells modules)			
DMxxx-M156-72	DMxxx-M156-72BK	DMxxx-M156-72P	DMxxx-M156-72S
DMxxx-M156-72BKS	DMxxx-M156-72UB	DMxxx-P156-72	DMxxx-P156-72BK
DMxxx-P156-72S	DMxxx-P156-72BKS		
DMxxxM2-72SW	DMxxxM2-72BB	DMxxxM2-72BU	
Group 3 (48 156.75 cells modules)			
DMxxx-M156-48	DMxxx-M156-48BK	DMxxx-M156-48P	DMxxx-M156-48S
DMxxx-M156-48BKS	DMxxx-M156-48L	DMxxx-M156-48BL	DMxxx-M156-48LS
DMxxx-P156-48	DMxxx-P156-48L	DMxxx-P156-48BL	DMxxx-P156-48LS
DMxxxM2-48SW	DMxxxM2-48BB	DMxxxM2-48SW-S	DMxxxM2-48BB-S
DMxxxM2-48SW-L	DMxxxM2-48BW-L	DMxxxM2-48SW-LS	
Group 4 (36 156.75 cells modules)			
DMxxx-M156-36	DMxxx-M156-36BK	DMxxx-M156-36P	DMxxx-M156-36S
DMxxx-P156-36	DMxxx-P156-36L	DMxxx-P156-36BL	DMxxx-P156-36LS
DMxxxM2-36SW	DMxxxM2-36BB	DMxxxM2-36SW-S	DMxxxM2-36BB-S
DMxxxM2-36SW-L	DMxxxM2-36BW-L	DMxxxM2-36SW-LS	
Group 5 (120 156.75 half cells modules)			
DMHxxxM6-120SW	DMHxxxM6-120BB	DMHxxxM6-120BW	DMHxxxP6-120
DMxxxM2-60HSW	DMxxxM2-60HBB	DMxxxM2-60HBW	

Group 6 (144 156.75 half cells modules)			
DMHxxxM6-144SW	DMHxxxM6-144BB	DMHxxxM6-144BW	DMHxxxP6-144
DMxxxM2-72HSW	DMxxxM2-72HBB	DMxxxM2-72HBW	
Group 7 (60 158.75 cells modules)			
DMxxx-M159-60	DMxxx-M159-60BK	DMxxx-M159-60S	DMxxx-M159-60BKS
DMxxx-M159-60UB	DMxxx-M159-60L	DMxxx-M159-60BL	DMxxx-M159-60LS
DMxxxG1-60SW	DMxxxG1-60BB	DMxxxG1-60SW-S	DMxxxG1-60BB-S
DMxxxG1-60BU	DMxxxG1-60SW-L	DMxxxG1-60BW-L	DMxxxG1-60SW-LS
Group 8 (72 158.75 cells modules)			
DMxxx-M159-72	DMxxx-M159-72BK	DMxxx-M159-72S	DMxxx-M159-72BKS
DMxxx-M159-72UB	DMxxx-M159-72L	DMxxx-M159-72BL	DMxxx-M159-72LS
DMxxxG1-72SW	DMxxxG1-72BB	DMxxxG1-72SW-S	DMxxxG1-72BB-S
DMxxxG1-72BU	DMxxxG1-72SW-L	DMxxxG1-72BW-L	DMxxxG1-72SW-LS
Group 9 (120 158.75 half cells modules)			
DMHxxxM6A-120SW	DMHxxxM6A-120BB	DMHxxxM6A-120BW	
DMxxxG1-60HSW	DMxxxG1-60HBB	DMxxxG1-60HBW	
Group 10 (144 158.75 half cells modules)			
DMHxxxM6A-144SW	DMHxxxM6A-144BB	DMHxxxM6A-144BW	
DMxxxG1-72HSW	DMxxxG1-72HBB	DMxxxG1-72HBW	
Group11 (120 166half cells modules)			
DMXXXM6-60HSW	DMXXXM6-60HBW	DMXXXM6-60HBB	
Group 12 (144 166half cells modules)			
DMXXXM6-72HSW	DMXXXM6-72HBW	DMXXXM6-72HBB	