PV-ezRack®

By Clenergy

PV-ezRack® Grounding System

Code-Compliant Planning and Installation Guide V1.0
Complying with AS/NZS1170.2-2011 AMDT 2-2016

Introduction

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By Clenergy

1. Introduction

The Clenergy PV-ezRack® Grounding system provides important guide for installers to achieve earthing continuity from PV modules to earthing cable. It includes two important parts: grounding clips layout design and grounding lug installation.

Please review this manual thoroughly before installing PV-ezRack® Grounding system.

The PV-ezRack® Grounding system parts, when installed in accordance with this guide, will be structurally sound and will meet the AS/NZS1170.2:2011 Amdt 2- 2016 standard. During installation, and especially when working on the roof, please comply with the appropriate Occupational Health and Safety regulations. Please also pay attention to any other relevant State or Federal regulations. Please check that you are using the latest version of the Installation Manual, which you can do by contacting Clenergy Australia via email on tech@clenergy.com.au, or contacting your local distributor in Australia.

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The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual;
- Ensuring that PV-ezRack and other products are appropriate for the particular installation and the installation environment;
- Using only PV-ezRack parts and installer-supplied parts as specified by the PV-ezRack project plan. (substitution of parts may void the warranty and invalidate the letter of certification);
- Recycling: Recycle: according to the local relative statute.
- Removal: Reverse installation process.
- Ensuring that there are no less than two professionals working on panel installation;
- Ensuring the installation of related electrical equipment is performed by licenced electricians;
- Ensuring safe installation of all electrical aspects of the PV array, this includes adequate earth bonding of the PV array and PV-ezRack® SolarRoof™ components as required in AS/ NZS 5033-2014 AMDT 2 2-2018;
- Verifying the compatibility of the installation considering preventing electrochemical corrosion between dissimilar metals. This may occur between structures, fasteners and PV modules, as detailed in AS/NZS 5033: 2014.

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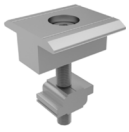
2. Tools and Components

2.1 Tools

Tools			
Screw Driver with 6 mm Hex Head drive bit	Tape	String & Marker Pen	Spanner
Torque Spanner			

2.2 Components

Component list			
			
ER-EC-ST Standard End Clamp	ER-IC-ST Standard Inter Clamp	C-U/30/46-G Universal Clamp with Grounding clip	C-U/30/46 Universal Clamp
ER-EC-DU35/40 End Clamp, Dual 35 or 40mm	ER-EC-DU40/46 End Clamp, Dual 40 or 46mm	EZ-CL-ST/UC Grounding lug with U-shape copper channel	EZ-GC-ST Grounding Clip

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3. Installation Instruction
3.1 PV Module Clamps Installation

The guide below is for PV module clamps installation. For PV Module installation, please follow manual provided by the manufacturer.

Before module and clamps installation, it is important to arrange how to position grounding clips to achieve earthing continuity between each PV modules and rails. The Clenergy recommends three different methods for Grounding Clips Layout Arrangement.

Method 1: "Even and Odd"

• When there is an even number of PV Modules in each row, install the grounding clips at the positions marked X in Figure 1, where the number of Grounding Clips = number of PV Modules. Figure shows 4 x PV Modules requiring 4 x grounding clips.

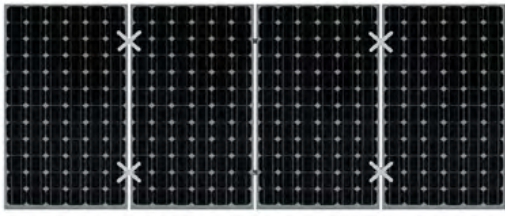

Figure 1

• When there is an odd number of PV Modules in each row, install grounding clips at positions marked X in Figure 2, where the number of Grounding Clips = number of PV Modules + 1. Figure shows 5 x PV Modules requiring 6 x grounding clips.

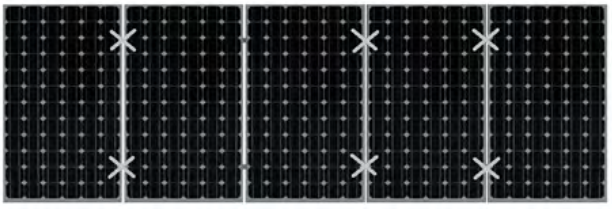

Figure 2

Method 2: "Zig Zag"

Install the grounding clips at the positions marked X in Figure 3, where the number of Grounding Clips = number of PV Modules + 1. Figure shows 5 x PV Modules requiring 6 x grounding clips.

Note: Please consult local PV Module supplier to check whether "Zig Zag" grounding clips layout has any effect on PV modules.

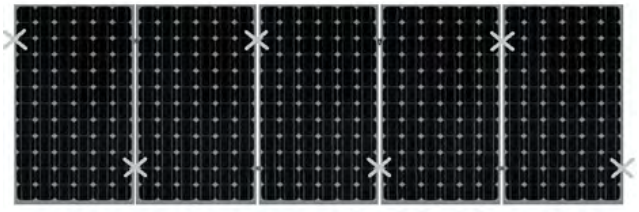

Figure 3 "Zig Zag" Grounding Clips Layout

Method 3: "All Inter Clamps"

Install the grounding clips at the positions marked X in Figure 4, where the number of Grounding Clips = (number of PV Modules -1) x 2. Figure shows 5 x PV Modules requiring 8 x grounding clips.

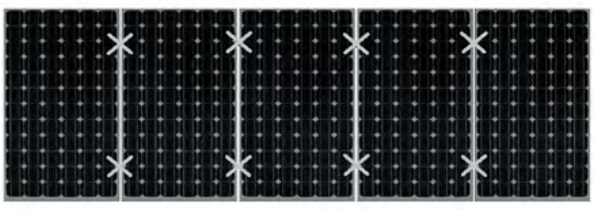

Figure 4 "All Inter Clamps" Grounding Clips Layout

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Important Notes for any of method above:

- When replacing defective PV Modules, it is required to replace the grounding clips under the defective PV Modules;
- When removing defective PV Modules, it is required to keep sufficient grounding clips to maintain all other PV modules' earthing continuity with the rail. It is required to install grounding clips under end clamps when necessary to achieve this;
- For array requiring more than 2 rows of rails, the layout and quantity of grounding clips are the same as those for 2 rows of rails.

There are two types of clamps for PV Modules Installation.

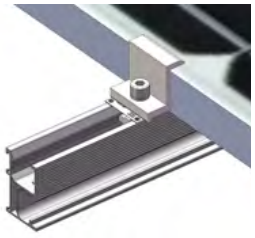

Figure 5

Option 1: Standard Inter and End Clamps

- Step 1: Place the first PV Module on the Rail according to your plan, and fix it in place using the End Clamps. Then fasten lightly as shown in Figure 5. If arranging grounding clips using "Zig Zag" layout method above, a grounding clip needs to be installed under an end clamp as shown in Figure 6;

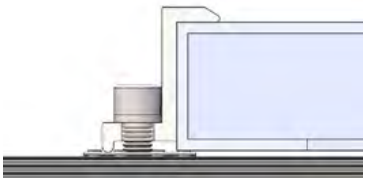

Figure 6

- Step 2: Slightly lift the PV Module and slide Inter Clamps and Grounding Clips into position. The teeth on Grounding Clip will automatically align when the Inter Clamp is properly installed as shown in Figure 7;

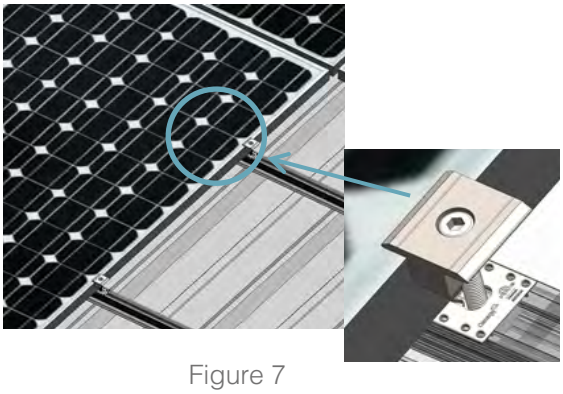

Figure 7

- Step 3: Loosely place the next framed PV Module into the other side of the Inter Clamp and Grounding Clip as shown in Figure 8.

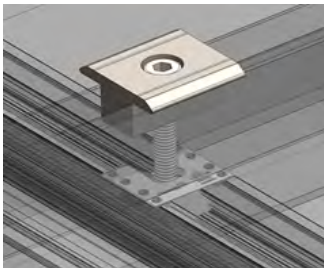

Figure 8

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Important Notes:

- To fix the Grounding Clip properly, ensure the frames of PV Modules are completely pressed against End and Inter Clamps and Grounding Clips. Visually check that Grounding Clips are positioned properly;
- Grounding Clips are intended for SINGLE USE ONLY! Only fasten the bolts down with recommended torque of 16~20 N·m when the position of the PV Module is finalized. (Only slightly tighten bolts to keep PV Modules in place prior to the final check).

Option 2: Universal Clamps

• Step 1: Turning the top plate of the Universal Clamp to switch the functionality between End and Inter Clamp as shown in Figure 9.

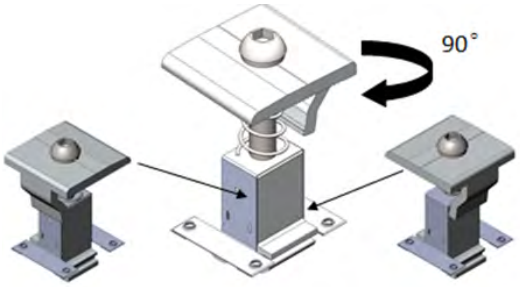

Figure 9

Note: Universal Clamp with part number of C-U/30/46 has no pre-fitted grounding clip and Universal Clamp with part number of C-U/30/46-G has pre-fitted grounding clip. Please use one of grounding clips layout arrangement methods above to position them correctly.

• Step 2: Incline the Universal Clamp to fit the lower channel of clamp against the lower rib of the Rail and press module of the Universal Clamp to click in the rail channel. Please make sure the upper channel of clamp fits against the upper rib of rail as shown in Figure 10.

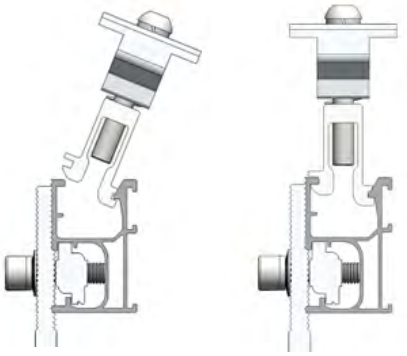

Figure 10

Note: Before clicking in, make sure there is enough room between two “claws” of the module otherwise it needs to screw up the bolt as shown in Figure 11.

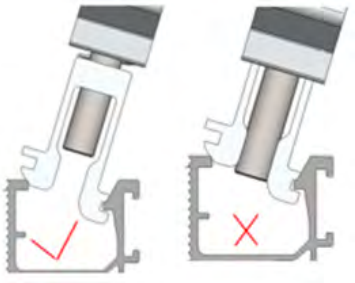

Figure 11

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• Step 3: Place the first PV Module on the Rails and apply the Universal Clamp as the End Clamp and fasten slightly. Make sure the frame of the PV Module is fully in contact with the Universal Clamp as shown in Figures 12 and 13. Visually check the Universal Clamp and PV module are properly installed;

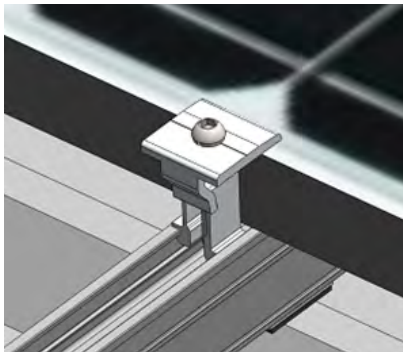

Figure 12

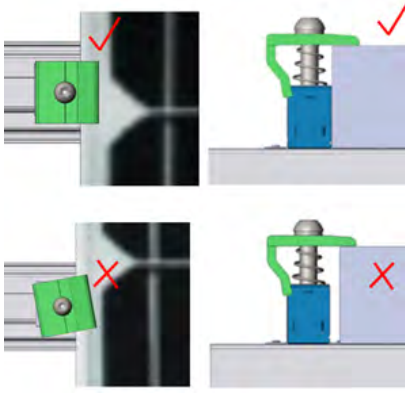

Figure 13

•Step 4: When using as an Inter Clamp, click the Universal Clamp into the rail channel and slightly lift the framed PV Module to ensure the Grounding Clip is properly positioned as shown in Figure 14;

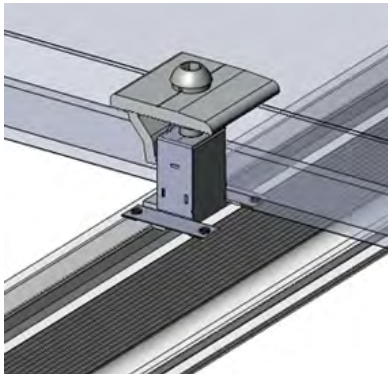

Figure 14

•Step 5: Loosely place the next framed PV Module into the other side of the Universal Clamp. Ensure the Grounding Clip is properly positioned, and the frame of the PV Module is in proper contact with Universal Clamp as shown in Figures 15 and 16;

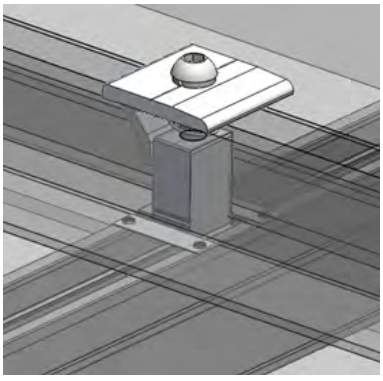

Figure 15

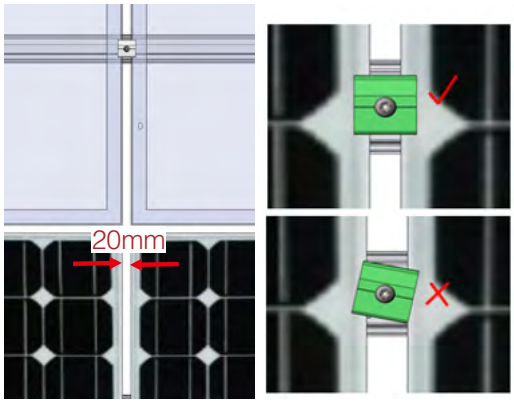

Figure 16

Note: The gap between two adjacent PV Modules generated by universal clamp is 20mm. The recommend torque for Universal Clamp as End Clamp is 13~14 N m. The recommend torque for Universal Clamps as Inter Clamp is 16~20 N m.

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3.2. Grounding Lug Installation

It is required to install one Grounding Lug per row of rail. The recommended fasten torque of the bolt M8*25 is 16~20 N m. For an array of PV modules having two rows of rails, two grounding lugs are required. For an array of PV modules having more than two rows of rails, two grounding lugs are required as well but grounding lugs need to be installed on the rows having grounding clips.

Once grounding lug fixing with rail, insert U-Shape Copper Channel into grounding lug as shown in Figure 17. Strip earthing cable (the maximum size is 10 mm^2), insert the conductor into the Copper Channel and tighten the bolt M6*14 with 5~6 N·m to ensure the earthing cable is tight.

Figure 17

Note: Please check the electrical resistance between rail and earthing cable conductor to ensure the bonding is made.

There are three options for Grounding Lug installation.

Option 1

Fix the Grounding Lug into the top channel of Rail as shown in Figure 18.

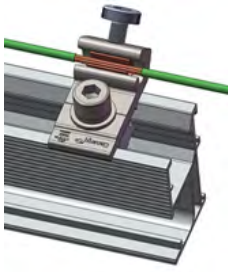

Figure 18

Option 2

Fix the Grounding Lug into the top channel of Rail where just under the PV Module as shown in Figure 19. Total height of grounding lug allows installation under 30 mm high PV module.

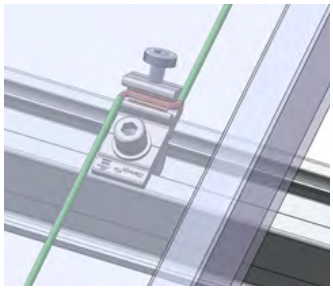

Figure 19

Option 3

Fix the Grounding Lug at the side channel of Rail as shown in Figure 20.

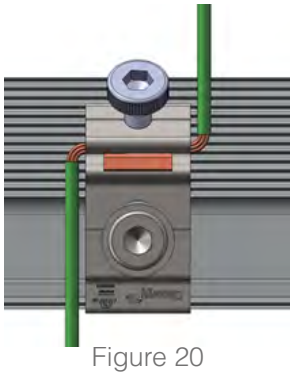

Figure 20

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PV-ezRACK® 10 Year Product Warranty

PV-ezRack®
By Clenergy

As the manufacturer of quality solar mounting systems, Clenergy Australia provides a warranty for all PV-ezRack products it supplies in Australia and New Zealand ("Products"). The warranty provided by Clenergy Australia is subject to the conditions contained in this document ("Warranty"). No other warranty provision implied or otherwise is to be assumed. Your Warranty coverage is in accordance with this document.

Product Warranty Table for Installations in Corrosivity Category 1, 2, 3, 4 and 5 (ISO 9223)

# Product		Material	Standard or Customized Product	Product Warranty		
				Corrosivity Category 1, 2 and 3	Corrosivity Category 4	Corrosivity Category 5
1	Aluminium Components	6005CL-T5 mill finish	Standard	10 years	10 years*	10 years*
		6005-T5 anodized to 10 microns	Standard	10 years	10 years*	10 years*
		6005-T5 anodized to 15 microns	Customized	10 years	10 years	10 years*
		6005-T5 anodized to 20 microns	Customized	10 years	10 years	10 years
2	Galvanized Steel Components	Galvanized Steel at 85 microns in average	Standard	10 years	10 years	Not warranted
3	Stainless Steel Components	SUS304	Standard	10 years	10 years	10 years
4	Fasteners (bolts/ nuts/washers)	SUS304	Standard	10 years	10 years	10 years
		SUS316	Customized	10 years	10 years	10 years
5	Buildex Screws for Tile Interface	Carbon Steel SAE 1022 with Climaseal 3 Finish	Standard	10 years	10 years**	10 years**
6	Buildex Screws for Tin Interface	Carbon Steel SAE 1022 with Climaseal 3 Finish	Standard	10 years	Not warranted	

* Subject to interface spacing reduction as advised by Clenergy Australia. Please contact us for more details.
**The screws under tile interface are assumed to be installed a category 1, 2 or 3 micro-climate within the roof structure.

Warranty Scope:

Your solar mounting Product has been manufactured to high standards, however, should any manufacturing defect arise, please contact Clenergy Australia. We will arrange for an inspection of the affected Product(s) to determine the extent of the problem.

Details are provided below as to the extent of your Warranty coverage and any exclusions that may apply. Please read these provisions carefully to ensure you receive the appropriate assistance and support in a timely manner. Please also contact Clenergy Australia if any part of this Warranty is unclear, or you wish to discuss your rights and remedies under this Warranty.

If your Product fails during the Warranty periods set out in the Warranty table above due to a defect in:
(a) materials and/or workmanship on and from the date of the Product's delivery; or
(b) structural integrity on and from the date of the Product's installation,

Clenergy Australia will at its election either repair or resupply the defective Product provided that:

- The Product was installed correctly by a Clean Energy Council ("CEC") accredited or equivalent accreditation installer, following the Clenergy installation manual provided at time of purchase.
- The Product has been maintained correctly in accordance with section "Care of your Product" below.

Warranty Conditions:

- Any and all costs for repair or replacement outside the Warranty period are the responsibility of the customer.
- Where Clenergy attends a site and finds that the Product is not faulty, the costs for the visit will be payable by the customer.
- Defective Products shall be uninstalled and/or reinstalled at the customer´s expense and risk.
- Under certain conditions, the Warranty can be extended to more than 10 years at an extra cost, available upon request.

Warranty Exclusions:

- Product finish (natural surface oxidation) or any natural impairment or surface corrosion that does not compromise the structural integrity.
- Products sold or installed outside of Australia and New Zealand unless approved previously in writing by Clenergy Australia.
- Damage caused by transport, mishandling, incorrect storage, improper loading or willful conduct.
- Any Product not correctly installed in accordance with our installation manual, or any specific design instruction or special conditions as advised by Clenergy Australia.
- Damage caused by the Product being modified in any way unless previously agreed to in writing by Clenergy Australia.
- The use of the Product for purposes other than the mounting of PV solar panels.
- Installations where the environment is excluded in the "Products Warranty Table" above, and for galvanized steel ground system Products, where the pH level is outside the range of 6-8, unless agreed to in writing by Clenergy Australia prior to installation.

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PV-ezRACK® 10 Year Product Warranty

PV-ezRack®
By Clenergy

- Damage caused by extreme weather conditions or any other natural or man-made event outside of our control.
- Damage caused by attachments not designed or approved for connection to the Product.
- Damage caused by lightning strikes or excessive currents through the earthing/grounding clamps, clips or lugs.

Our Products may come with guarantees that cannot be excluded under the Australian Consumer Law. You may be entitled under statute to a replacement or refund for a major defect in the Products. You may also be entitled under statute to have the products repaired for any defect which does not amount to a major defect. The benefits given by this Warranty are in addition to any statutory rights and remedies you may have under Australian law.

Product Care:

Clenergy Products are designed to be durable with minimal care, however it is important that you maintain your mounting Product in accordance with proper practices. This includes regular maintenance and inspection to avoid damage.

The aluminum components are made from either AL 6005CL-T5 or AL6005-T5 and may also have a clear anodization. The aluminum may undergo some surface oxidization in service. Please note that this is normal and part of the natural ageing process. The result may even be beneficial to the longevity of the Product, as the oxidization can provide additional protection against degradation by pollution and atmospheric corrosion.

- The torque values of fastener connections on mounting system must be checked annually and corrected if needed in accordance with Clenergy Australia's installation manual.
- Regular cleaning to remove any soil or other possible contaminants must also be performed. Cleaning should be performed in accordance with guidelines recommended by the Galvanizers Association of Australia (GAA) (for Products supplied in Australia) or the Galvanizers Association of New Zealand (GANZ) (for Products supplied in New Zealand) or any other similar organisations (as applicable). When using tin interfaces for installation works, screws not exposed to frequent rain should be washed down with fresh water at least every 6 months.
- You should not use harsh chemicals or highly abrasive materials that may damage Product surfaces. Use only cleaners that are designed for aluminium and always wash them off with clean water afterwards. Steel components should be inspected before and after installation and any damage to the galvanizing should be treated immediately to prevent rusting. It is normal for galvanized Products to develop a surface barrier (the 'patina'), which helps to protect the surface from contaminants in the atmosphere and does not adversely affect the Product.
- You should also ensure that if the Product is stored prior to installing that it is not contaminated by contact with rusty items or other impurities such as dirt and chemicals. Should this occur, you must clean the Product and make any repairs using approved methods such as galvanized paint and antirust treatments immediately before installation.

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Innovating renewable energy

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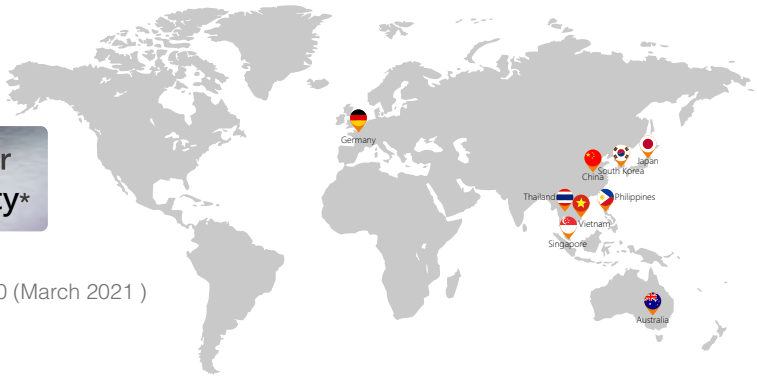
Worldwide Network



10 Year Warranty*