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OPERATION AND MAINTENANCE MANUAL
 and
MANUFACTURER'S WARRANTY

Fixing system:

Standalone ground, single-support and double-support

NOTE:
Read carefully and keep for later use.
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II. MANUFACTURER'S WARRANTY
 I. OPERATION AND MAINTENANCE MANUAL (OMM)

FAILURE BY THE PURCHASER TO COMPLY WITH THE GUIDELINES CONTAINED IN THIS DOCUMENTATION RELEASES THE MANUFACTURER FROM ANY WARRANTY OBLIGATIONS

1. Purpose of the OMM

The purpose of this operation and maintenance manual is to acquaint the Buyer / User with the structure, principle of operation and correct handling of the product, as well as to present the guidelines for their storage, transport and installation.

2. Subject of the OMM

The subject of this documentation covers components for the systems intended for standalone ground photovoltaic installations.

3. Packing, storage, transport

The product should be packed in outside packaging preventing the system components from being disassembled. After unloading, the polypropylene film must be removed from the product in order to avoid exposure to sunlight, and if the guidelines are not followed, there is a risk of aluminum discoloration on the profile, or the product should be placed where the profiles and components are not exposed to sunlight. After delivery it is absolutely necessary to check the product for quality and possible shortages in the set.

The product should be stored in a room protected from precipitation, contamination, dirt, mechanical damage and far away from any caustic and corrosive agents. After unloading, the product must not be wet.

When finished products are delivered to the recipient they are protected from damage. The loading, transport and unloading must ensure protection from mechanical damage and driving safety during transport. Completeness of the delivery and the proper condition of products are confirmed in writing by the recipients in a stock issue confirmation (CI) or another corresponding document where any notes on the product, where applicable, should be recorded.

4. Installation

The installation should be carried out in accordance with the manufacturer's instructions.

It is forbidden to interfere with the structure by drilling holes, grinding edges, cutting or other activities damaging the protective coating.

The installation of the earthing system, inverters, cables or other devices should be carried out on existing holes made during the prefabrication process. If there are no such holes, or there is a need to install the system in a place different from the one provided for, the devices should be installed in a non-invasive way, not damaging the protective coating.

The contact points between the upper part of the legs and the pile-driver's head should be protected with zinc paint over the scratch distance during the driving process.

Remove any dirt from the elements that arose during the installation process before the next stages of the installation.

When laying cables in the ground, connected to inverters, make sure that they are not backfilled with an excavator or other heavy construction equipment without a fixed/supported structure directly affecting the substructure. In such cases the inverter mount is deformed. There is also a need to ensure correct operation of the cable connected to the inverter regarding different seasons and ground behaviour caused by temperature changes.

During the use of stainless-steel elements (connectors, washers, earthing plates) on surfaces, they may become discoloured locally. These changes are superficial and do not affect the products' mechanical properties. The discolorations appear most often e.g. on nuts and washers due to tightening them with black steel wrenches without any anti-corrosion coating.

The ENERGY5 support structure is intended to be installed by a professional assembly crews with appropriate equipment and experience. A principle has been adopted that the installation manual presents the method of installation and arrangement of individual driven elements in relation to flat terrain. For this purpose, ENERGY5 has provided some mounting tolerances that allow for possible adjustments to the structure. However, the final adaptation of the structure to the terrain is always the responsibility of the installation company in consultation with the Investment Supervisor. If the terrain is uneven, follow the steps described below:

- Check whether the designed level for driving the legs allows to achieve the required rafter angle, and whether the lower edge of the lower module is placed about 700 mm above the ground level. If the required parameters are not reached, corrections should be made, e.g. by driving the front leg deeper if, for example, the rear leg is in relation to the front leg at the point of slope and has been driven to the required depth. Such an operation must be conducted before the complete rows of legs are being driven. Each time the terrain changes, this operation must be repeated. The structure must be installed a way ensuring the minimum depth for driving the legs required in the design. Therefore, it is better to drive the element deeper than too shallow. The whole process of driving the legs should be

planned this way that at the end of the installation the whole structure meets all the design requirements.

- When installing benches on a slope in longitudinal direction, it is also necessary to plan the installation in agreement and upon consultation with the Investment Supervisor. The structure must be installed a way ensuring the minimum depth for driving the legs required in the design. The structure should be arranged as to ensure gentle slopes and hills. In such a case, the planes of the structure's components (legs/rafters/purlins) do not need to adhere to each other perfectly, but they will be bolted together by screw joints. The installation manual includes specific guidelines and instructions in this scope.

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5. Use of the product

a) Maintenance

To ensure correct operation and long retention period of the system during the first year of use there is a need to carry out two inspections of fastening and fixing components. The inspections should be carried out every year during the following years of use. Check whether the fixing screws and bolts are tightened and that they are in correct positions. It is absolutely forbidden to enter the structure or load it in any other way. If any loose fastener is noticed, it is absolutely necessary to secure the area around the structure for bystanders. Afterwards, the repair must be made in accordance with the OHS regulations and instructions from the manual.

b) Cleaning

To maintain an attractive look of the fixing structure, it must be cleaned regularly. Clean frame components ensure more attractive appearance, longer durability and better performance.

Note!

Do not use any alkaline substances for cleaning! Both the aluminum profiles and glass on the panels are sensitive to alkaline substances.

If for example cement water or mortar reaches the aluminum profiles or glass panels, it must be immediately washed off with regular water using a sponge or a cloth. Do not use any detergents with polishing or scrubbing additives like e.g.

Scotch-Brite! There is a risk of mechanical damage to the surface.

It is best to clean the system components with regular water and a sponge, but some neutral detergents can be used as well.

6. OHS

Generally applicable occupational safety regulations must be observed when installing, using and repairing products covered by this OMM. This includes:

- Personal protective equipment such as a helmet, other protective clothing, a harness with braking and hooking ropes,
- Using ladders, scaffoldings and other lifting equipment with required approvals confirming their suitability,
- Working with electrical devices that have valid tests/inspections. The same applies to extensions and splitters,
- Separating the area for bystanders where the work is being carried out,
- Having a valid clearance for works at height.

II. TRANSPORT AND STORAGE OF MATERIALS

1. **After the materials are delivered, make sure that the delivery of the goods is consistent with the order and contains all products listed in the stock issue confirmation (CI).**
2. **If any delivery deficiencies, errors or damages that arose during the transport are noticed, they must be reported to the supplier immediately (within 7 days) and noted on the delivery document.**
3. **All inconsistencies, and in particular the faults and damages must be reported and noted by the Manufacturer before the product is installed. Any claims filed after the damaged materials are installed will not be recognized.**

4. The unloading should be carried out with adequate mechanical tools not causing damage to the transported sheets.
5. In the case of manual unloading and handling of the sheets, particular attention must be paid not to damage the delivered materials. A sufficient number of persons must be ensured for the unloading to avoid any irreversible damages and deformations. Drawing rails and sheets on the ground can cause scratches on the surface.
The sheets must be lifted by holding the edges of the transverse embossing. The final transport to the roof should take place on prepared supports.
6. The delivered materials must be used as intended.
7. The use of the materials should be compliant with the applicable regulations and standards.
8. The delivered materials must be stored at a height of at least 20 cm from the ground. The spacers should be laid no more than 1 m from each other, along the entire length of the plate.
9. The storage time (from the date of manufacture to assembly) must not exceed 3 months.
10. If the materials get wet during transport, unloading or storage, it is essential to dry all the sheets and to put wooden spacers between all the sheets. Storage of wet sheets may cause the paint coating to scale or lead to corrosion outbreaks.
11. The manufacturer and the supplier are not liable for damages to the materials stored not in accordance with the above recommendations.
12. If necessary, the profiles must be cut with suitable tools, not causing heat or damage.
13. It is forbidden to cut with an angle grinder.
14. Any impurities that emerge during installation of the sheets must be removed from the surface, in particular the swarf caused by cutting.

15. Any possible mechanical damage must be immediately repaired with adequate mortar.

NOTE:

The delivered materials must be stored in dry and well-ventilated rooms, protected from sudden temperature changes. Any damages caused by the above-mentioned factors will result in the dismissal of any potential warranty claims.

Annex 1

10 year warranty in solar applications for Magnelis® ZM310 and ZM430 coatings.

Conditions of use

This warranty applies to supporting structures in all solar applications, e.g.:

- Sheets or other elements of roofing or cladding (forming part of the roofing or cladding, e.g. trapezoidal sheets, corrugated sheets, tiles or sandwich panels) that carry the weight of cells or photovoltaic (PV) panels,
- Sections between the roofing and PV panels (connecting elements),
- Deep-drawn sheets for waterproof housings for solar panels or as a supporting structure for PV panels and
- Profiles for supporting the panel structures in solar power plants.

This warranty covers the supporting structures located in areas with normal atmospheric corrosivity categories (C1... C4 according to EN ISO 12944-2), i.e. excluding highly contaminated areas or at a distance lower than 2.0 km from the sea and/or exposed to continuous spraying of fresh or saltwater (corrosivity category C5-I and C5-M according to EN ISO 12944-2).

This warranty is valid for 10 years when Magnelis® ZM310 and ZM430 coating is applied in areas more than 300 m and up to 2.0 km from the sea (C5-M according to EN ISO 12944-2), provided that the installation is not continuously sprayed with fresh or saltwater, and the Magnelis® ZM430 coating warranty covers parts used in supporting structures of solar installations which are in contact with the ground:

- Carrying poles - rear and front legs

In the case of parts that are only partially fixed or driven in the ground, this Warranty covers the whole part with Magnelis® ZM430 coating.

1. This warranty covers the supporting structures exposed to moderate emissions of corrosive substances, namely it does not cover the structures exposed to fallout of any corrosive chemical substances, smoke or rainwater including carbon, sediments or particles of heavy metals such as iron or copper or alkaline products such as ash, cement dust or animal feces.
2. This Magnelis® coating warranty does not apply to:
 - Cold-formed elements for which no free water drainage is provided,
 - Sets containing elements that may contribute to maintaining dirt or moisture on the Magnelis® coating surface, Sets in which Magnelis® coating surfaces are separated from each other or from surfaces made of other materials only by a narrow gap,
 - Welded sets, if the defect occurs less than 50 mm from the welds and if the welds have not been secured after welding and are not regularly inspected,
 - Sets, where the Magnelis® coating is glued to itself or to other materials,
 - Circumstances when the surface of the Magnelis® coating touches the soil outside the ZM430 coating,
 - Applications in water circulation systems in solar devices, including storage tanks.
3. This warranty covers only the applications where the Magnelis® coating is an uncovered metallic coating, as delivered by ArcelorMittal.
4. This warranty does not cover the appearance of the cut edges, discoloration of the Magnelis® coating due to run-off from the cut edges or adjacent elements (made from any material).
5. The warranty for anti-corrosion protection does not apply in places exposed to intensive abrasion (deserts areas with strong winds and friction by sand grains).
6. The installations using the Magnelis® coating should be inspected once a year. The inspection is carried out by the Client or their authorized representative. The installations must be

cleaned regularly, and any spotted damages (scratches, dents, etc.) must be repaired.

At the time of inquiry or order, special control precautions may be agreed upon in relation to maintenance:

- Once a year, the Client or their authorized representative should verify all elements of the installation and repair any noticed damages (scratches, dents, etc.)
- There is a need for annual maintenance of the entire installation in order to remove dirt, leaves or other contamination which may prevent free water discharge, and the external and internal elements of the installation must be additionally washed. The Client or their authorized representative must check whether the cleaning process and the applied detergent can damage the Magnelis® coating.
- **The Client must be able to prove that the inspection and maintenance have taken place, if agreed at the time of inquiry or order.**

Structural principles

Cold-bent sections included in the system are manufactured in accordance with PN-EN 10162 standard.

For the warranty to apply, the following principles must be followed while designing, manufacturing and installing the separate elements.

1. The internal bending radii must be at least twice the plate thickness ($r > 2 \times$ thickness).
2. The entire set must be designed and installed so that no stagnation of water or sewage - organic or otherwise - can occur on the surface of the Magnelis® coating, including the fasteners and the areas under the profile overlaps.
3. All surfaces must have an inclination angle of at least 2 degrees in order to allow water to drain off.
4. The fasteners must not have copper or lead elements that come into direct contact with Magnelis® coated sheet or any other material that may cause corrosion infiltration on Magnelis® coated sheet. They must be properly shaped to prevent any local dents in the Magnelis® coated sheet which could prevent free discharge of water.
5. The structural design should prevent the risk of local corrosion, e.g. caused by water dripping on the Magnelis® coated surface.
6. Stainless steel fasteners must be adequately protected against contact with the Magnelis® coated surface in order to

avoid increased corrosion due to formation of a corrosion cell.

One possible solution is to use plastic pads to separate the connectors from the Magnelis® coated surface.

7. When forming, avoid exposing the Magnelis® coated sheet to high tensile stress or alternating bending stresses.
8. Magnelis® coated parts that have been mechanically or chemically damaged during molding, transport, storage or assembly, cannot be used. The elements damaged after the installation must be replaced before the construction works are completed.
9. Avoid any contact with wet insulation materials, impregnated wood and other corrosive products. After the installation remove any tools, waste and other objects.

