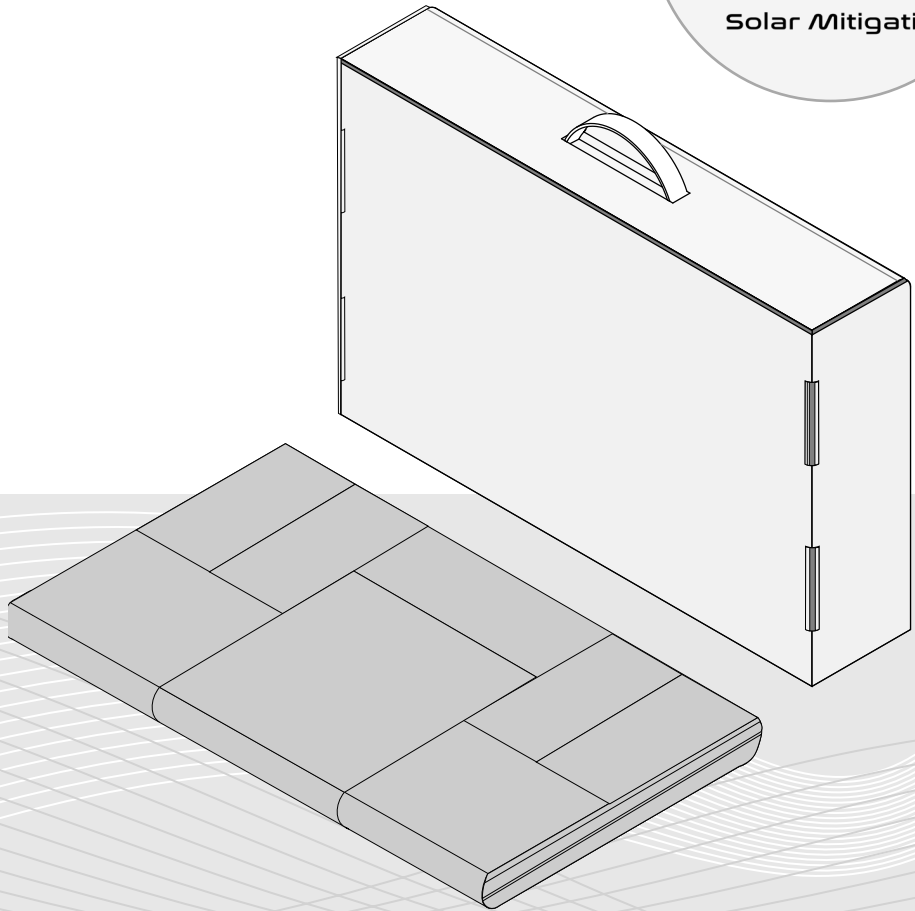




O&M MANUAL

LEMUR-AG15

Solar Mitigation



English

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| Version | Implemented By | Revision Date | Approved By | Approval Date | Reason |
|---------|----------------|---------------|-------------|---------------|---------------------|
| 1 | N.D.H. | 12/13/20 | NWR | | O&M Manual Creation |

1. INTRODUCTION

1.1 SAFETY NOTES

| SAFETY PRECAUTIONS | |
|---------------------------|---|
| GENERAL | The need for Personal Protection Equipment (PPE) must be assessed prior to undertaking installation or maintenance operations. |
| HEAVY EQUIPMENT | All manual handling must be in accordance with the Manual Handling Operations Regulation 1992 |
| LETHAL VOLTAGES | <p>Electrical power within the systems/equipment LEMUR-AG15 is applied to is at a level considered, by the low voltage directive 73/23/EEC, to be sufficient to kill.</p> <p>Before attempting an installation of LEMUR-AG15, ALWAYS ensure that a touch before test is carried out on the housing to be worked.</p> <p>Installation is to be undertaken only by personnel who are aware of the dangers related to voltage and current.</p> |
| WORKING PRACTICES | <p>Unauthorized interruption of the system may endanger the safe operation of the railway. Before attempting any installation, obtain the necessary permission from the relevant authority.</p> <p>Ensure the consequence of any interruption has been fully considered and understood.</p> <p>This product does not liberate any toxic or injurious gases during normal operation.</p> <p>When installing LEMUR-AG15, do not wear metal rings, bracelets, watches, etc. These articles can cause personal injury or damage to equipment.</p> |

1.2 PURPOSE

This O&M Manual defines the operating & Installation guidelines for LEMUR-AG15

1.3 GUARANTEE

The function and safety of the equipment is only guaranteed if the warning and safety instructions included in this manual are adhered to.

Haide Technologies Ltd is not liable for any personal injury or damage to property that occurs as a result of the warning and manual being disregarded.

Haide Technologies Ltd does not accept any liability or warranty for damage due to the use of non-approved spare parts and accessories.

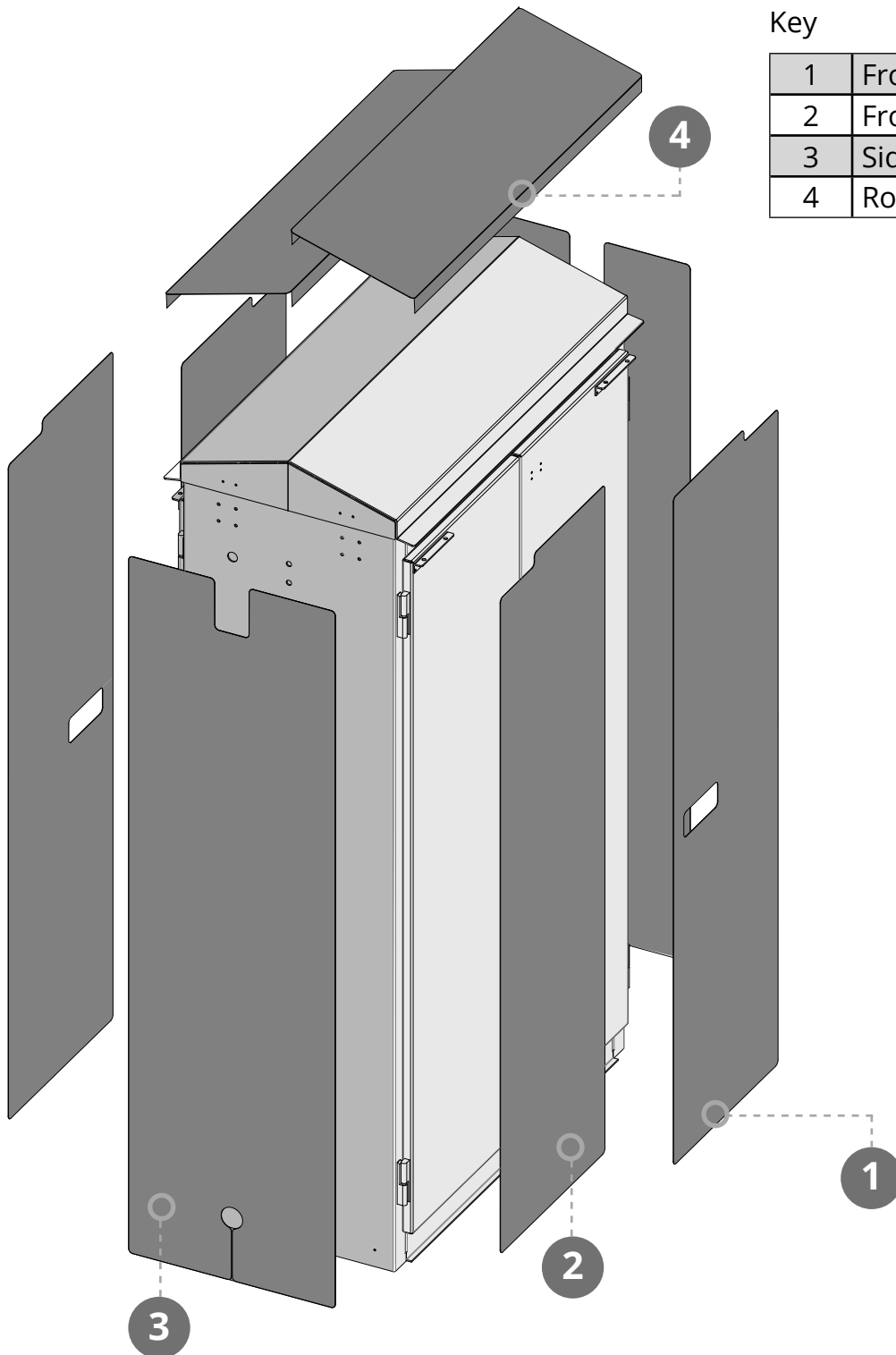
2. PRODUCT DESCRIPTION

2.1 LEMUR-AG15 ® FEATURES

LEMUR-AG15 has an ingress protection level of IP6X and is suitable for outdoor Railway Installations. The material is pre-cut to the pattern of the specific housing, adhesive backed for fast installation and as installed without the need for plant or specialist tools in under 15 minutes. There is no requirement to open the enclosure doors or de-energise the equipment for the purpose of installation. No drilling or supplementary bonding is required for track side apparatus housings.

Key

| | |
|---|--------------------------|
| 1 | Front Door Right Pattern |
| 2 | Front Door Left Pattern |
| 3 | Side Pattern |
| 4 | Roof Pattern |



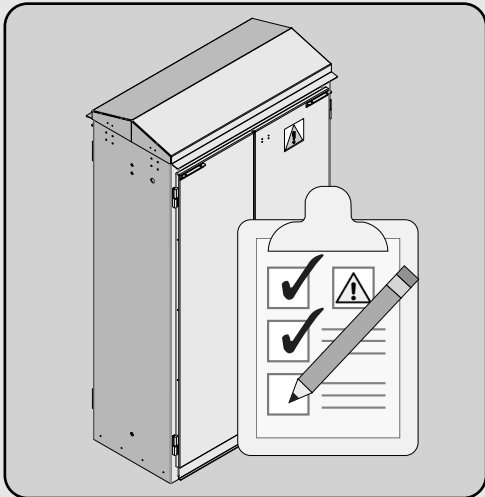
*Typical LOC Case & LEMUR-AG15 Pattern Installation
LOC Case and LEMUR-AG15 Patterns Vary

2.2 PRODUCT FUNCTION

- LEMUR-AG15 is an unprecedented solar shielding compound textile for external equipment housings, specifically those suffering the effects of solar gain. The product reflects the sun's electromagnetic waves across the full spectrum and is tested and proven to deflect 97% of our sun's electromagnetic radiation away from the surface protected. When applied to a thermally conductive surface LEMUR-AG15 provides a barrier to long and short waves of radiation leading to a significant reduction in thermal related asset failure during summer months and within warmer climates.

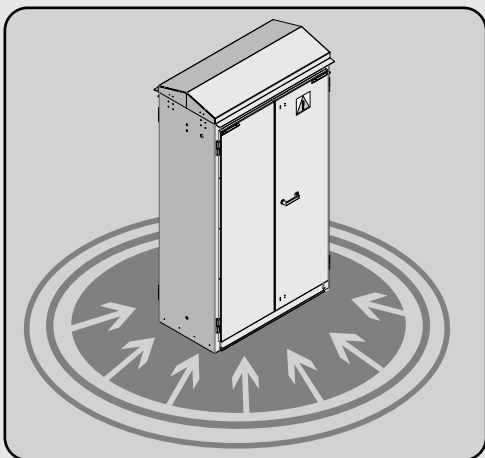
3. PRODUCT INSTALLATION

3.1 PREPARATION



1. Existing Labels & Decals

Ensure that all Labelling to be covered during installation has been noted and details recorded for duplication and application of new labels post fitting LEMUR-AG15.

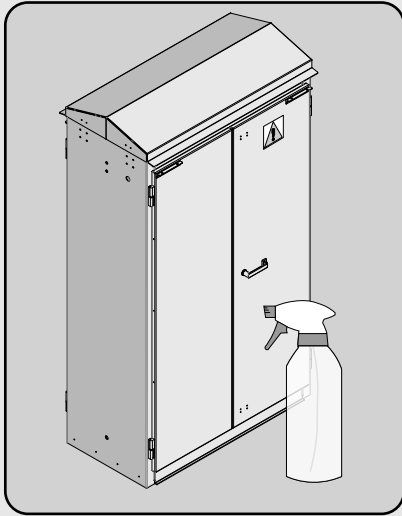


2. Repercussions

Ensure that the area to be worked is free from hazards, there is adequate space to unpack and fit LEMUR-AG15 panels in a safe and controlled manner.

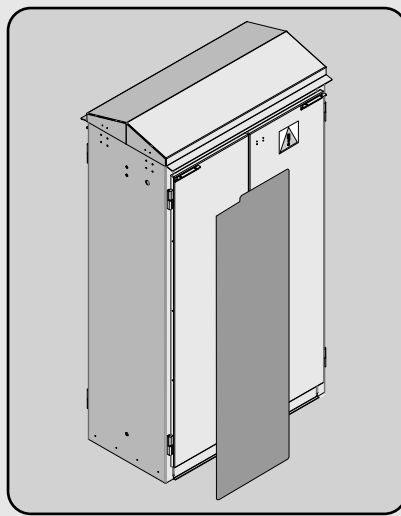
3. PRODUCT INSTALLATION

3.1 PREPARATION



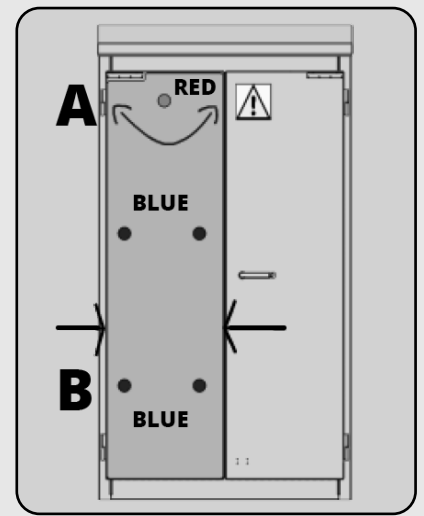
3. Surface Inspection

Use LEMUR-X15 cleaning spray (CAT #1236HT1) and ensure all surfaces are dry and free from debris.



4. Product Alignment

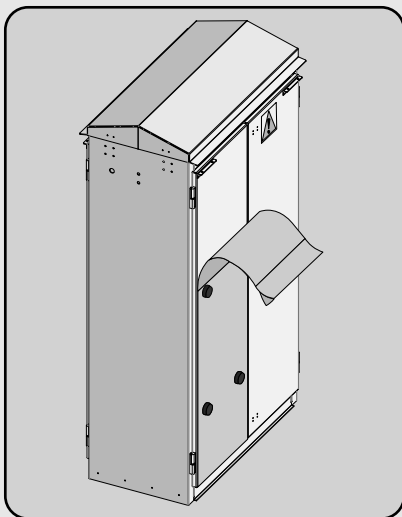
Place the first LEMUR-AG15 Panel Against Corresponding LOC Panel



5. Magnets

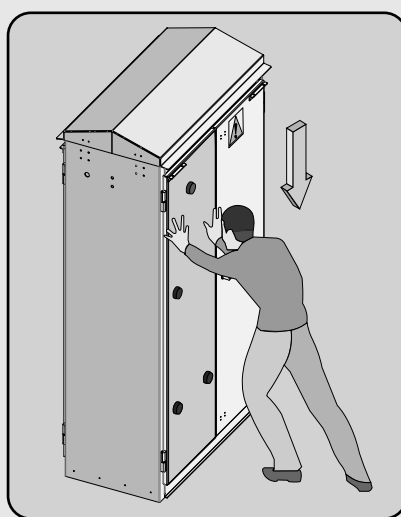
A) Use the red magnet to hold the panel in place and align parallel to the loc

B) Use the blue magnets to secure the panel in place



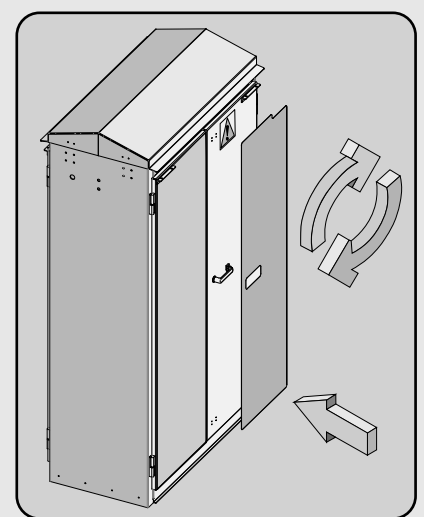
6. Initial Peeling

Remove the red magnet and peel off the first 15cm of backing tape.



7. Pressing

Press the 15cm of exposed tape against the loc then continue to peel small sections of backing tape then press against the loc until the full panel is secure.



8. Repeat

Once the first LEMUR-AG15 panel has been fixed into place repeat the same process with the remaining panels.



9. Even Out Surfaces

For final stage it is recommended that the product is properly evened out and bonded to the surface, there should be no corners or edges that are exposed to water ingress or air (should be air sealed tight). This can be achieved by using an Ink Roller, a plastic card (e.g. loyalty card) or a flexible piece of card. Do not use anything harsh or abrasive.

3.2 CHECK LIST

- Correct LEMUR-AG15 kit for the planned installation
- LEMUR-AG15 Installation kit has been checked and is complete.
- A safe area has been identified for unpacking the LEMUR-AG15 kit without damage or contamination.
- All Labels & Decals have been recorded.
- The surface to be coated has been inspected and suitable for the application of LEMUR-AG15

3.3 INSTALLATION REQUIREMENTS

- Do not install below 10 Degrees Centigrade
- Do not install onto wet surfaces
- Must use LEMUR preparation spray to clean surface before installation
- Do not fit damaged panels
- Fit all panels within the kit for maximum performance
- Ensure no contaminants meet adhesive backing before fitting
- Do not try to remove LEMUR panels once fitted
- Ensure panel edges and corners are pressed down firmly with recommended tools post installation
- Do not install on to compromised post factory modified surfaces (i.e. flaky and cracking wet coated paints)

4. PRODUCT MAINTENANCE

4.1 ROUTINE MAINTENANCE

LEMUR-AG15 is not part of an electrical or mechanical system. The material can be cleaned as required and is resistant to alcohol based cleaning agents and degreasers. Inspection to the integrity of the product should be made periodically to ensure that there is no delamination from the housing and that no evidence of vandalism is present. Large areas of damage caused by rolling stock debris should be repaired using the LEMUR-AG15 Patching kit.

This does not supersede any maintenance tasks or scheduling procedures network rail deem necessary and set in accordance with. NR/SP/SIG/10661 Signalling Maintenance Task Intervals.

4.2 REPAIRS

In the event that repairs are required the following guidance is provided.

1. Always carry out repairs in a controlled and safe manner.
2. Identify if the repair can be completed with the Patching kit, or if the whole panel needs replacing.
3. For Patching repairs, this must be done using the LEMUR-AG15 patching kit, catalogue and following the specific instructions included.
4. For full panel replacement, LEMUR-AG15 can be removed manually with enough force. Details of the enclosure pattern and specific panel removed should be noted and recorded for ordering spares.

Relevant safety checks & testing should be conducted in addition to these checks & in line with Network Rails controlled safety & inspection procedures prior to energizing the transformer.

4.3 MAINTENANCE AFTER FLOODING

LEMUR-AG15 is water tight and would typically require no maintenance other than a visual inspection post exposure to flooding. Any concerns should be directed to Haide Technologies Ltd.

5. TRAINING & COMPETENCE

All maintenance activities shall be undertaken by trained and authorized Network Rail crews and/or contractors.

6. PRODUCT MAINTENANCE

6.1 DATA SHEET REFERENCE

Refer to manufacturers Datasheets for required specification.

6.2 NR COMPONENT APPROVALS

| | |
|---------------------|-------------------------------|
| CUSTOMER | DECLARATION OF CONFORMITY |
| | NETWORK RAIL |
| PRODUCT NAME | LEMUR-AG15 |
| DATA SHEETS | AVAILABLE ON REQUEST: DOC REF |

6.3 DECLARATION OF CONFORMITY

Haide Technologies Ltd claim conformity for LEMUR-AG15 in accordance with the specifications referenced below. This declaration is based upon our technical file which contains data supporting our claims.

| COMPLIANCE SPECIFICATION(S) | |
|---|--|
| EC Directives | 2006/95/EC Low Voltage Directive |
| Harmonized Standards | TBA |
| Internal Standards | ISO 9001: 2015 BSI Audited Quality Assurance |
| Customer Standards/Specifications | TBA |
| This declaration is made by: Mr. Neville D Haide (Company Director) Haide Technologies Ltd. The Copper Room, Deva City Office Park, Trinity Way, Manchester M3 7BG | |
| Declaration by: N. Haide | Date 15/03/2020 |

7. CONTACTS

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8. REGULATORY REQUIREMENTS APPLICABLE STANDARDS

BS EN 50125-3 – Railway applications. Environmental conditions for equipment. Equipment for signalling and telecommunications.

NR/L1/ELP/27000 – Asset Management Policy for Electrical Power assets.

NR/GN/ELP/27315 – Management of Power Supplies for Telecoms Equipment.

NR/L3/SIG/10663 – Signal Maintenance Specifications.

NR/SP/SIG/11221 – Signalling Works Testing.

NR/SP/SIG/11231 – Signalling Maintenance Testing Handbook.

9. FREQUENTLY ASKED QUESTIONS

1) What tools are required to fit LEMUR-AG15 ?



WARNING

Ensure that Test before Touch is carried out before fitting LEMUR-AG15

- **No tools other than the LEMUR-AG15 Installation kit are required.**

2) Can LEMUR-AG15 be installed in the rain ?

- While LEMUR-AG15 will adhere to damp surfaces we recommend that surfaces are dry and installation is not carried out in the rain.

3) How much does LEMUR-AG15 weigh?

- LEMUR-AG15 is a light weight product, Location case kits weigh circa 3KG for a half Location case and 6KG for a full Location case.

4) What is the procedure for installing LEMUR-AG15?

- Please refer to the Installation section of this manual

5) Can LEMUR-AG15 be stuck over another LEMUR-AG15 panel ?

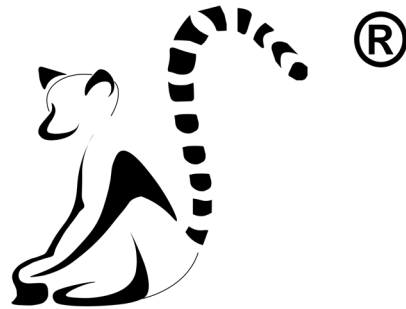
- Yes, in the event that a panel needs replacing you can either remove the damaged panel or stick a new panel over the top of the existing. If laminating over an existing panel we recommend this is only done once during the life of the product.

10. PRODUCT WARRANTY

These products are under Haide Technologies standard warranty which is 12 months. Product warranty document is available upon request.

11. END OF LIFE DISPOSAL

End of life material should be issued to a certified waste disposal vendor.



LEMUR-AG15
Solar Mitigation

LEMUR-AG15



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