Standard Operating and Maintenance Manual for ESL

Version 1.0

DOCUMENT HISTORY

Rev.	Date	Revision History
1.0	29-04-25	Initial draft

Table of Contents

This manual has important guidelines and best practices for effectively utilizing electronic shelf labels in retail environments. Please follow these guidelines, standard procedures and maintenance manual

1.Product Handling Precautions

Provisions should be made to protect against any damage to the product caused by improper handling. The purchaser assumes any responsibility for damage to the product caused by improper handling.

Product should be stored in 32 °F ~ 104 °F (0°C ~ 40°C) @45~70% RH environment and should be installed within 90 days of receipt.

1.1 Usage Environment

Take extra caution when using this RF device in the vicinity of other electronic devices and appliances. Most electronic devices and appliances use electromagnetic waves. Electromagnetic waves emitted by this RF device can affect other electronic devices and appliances. If using the device in an explosion hazard area, follow all safety regulations, instructions, and signals.

1.2 Storage and Use

- The product is shipped in sleep mode (white screen), so it should be activated by pressing the button.
- Moisture and liquids can damage internal parts and circuit boards if allowed to enter into the device itself.

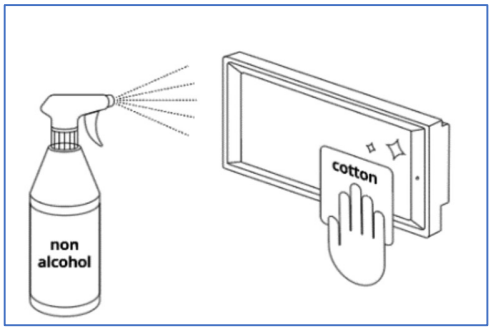
- Do not place or store the product on a sloped surface. The product may slide and fall off the surface and become damaged.
- Use the product in temperatures ranges of 0℃~40℃/32~104℉(BWRY), or -25℃~0℃/-13~31℉(Freezer). Parts and circuits may be damaged if operated or stored in extreme temperature.
- The display panel needs extra care during handling.
- Do not apply any impacts on the e-Paper display as it is fragile.
- Continuous exposure to excessive moisture (over 70% RH) or UV shortens display lifetime.
- Ghosting image may appear in temperature conditions of less than 15℃/59℉ for normal tags and -25℃ / -13℉ for freezer tags. (If ΔL* >2, we call it ghosting phenomenon)
- Avoid areas with strong magnetism or subject to magnetism. Contact between the device and a magnetic object can lead to malfunctions.
- Do not place the product near heat-producing kitchen appliances like a stove or a microwave or in the vicinity of highly pressurized containers.
- External impact to the product, such as from being dropped, can damage the product.
- Twisting and bending the product can damage the exterior casing and the internal components.
- If this product operates abnormally while removing battery or replacing battery, it needs to be discharged by contacting the battery terminals (+) and (-) in the product.
- This product uses the 2.4GHz frequency band for the wireless communication network. Radio communications can be limited or affected

by other applications that share the same frequency band, such as WiFi, Bluetooth, Zigbee, etc.

- A prior investigation into the radio environment is strongly required for efficient and smooth installation.
- Frequent communications, updates and screen renewals may reduce battery life time.
- Low temperature environments may reduce battery life.
- FIFO (First In First Out)

1.3 Product Cleaning

1.3.1 For Spray Cleaning:



Steps

1. Lightly spray all surfaces and wait a few seconds.
2. Gently wipe clean using a cloth or tissue.
3. Let the labels dry.

Notes:

➢ Use mild, non-alcoholic detergents or glass cleaner.

➢ Recommend non-abrasive cloths: Microfiber, Cotton T-shirt, Cotton handkerchief, Cotton tea towel.

1.3.2 For Wet Tissue Cleaning:

Steps

1. Stand or lay down the labels.
2. Wipe using wet tissues.
3. Let the labels dry.

1.4 Battery Replacement

Audience

Authorized personnel with the following knowledge are allowed to replace the battery: Battery / Electronic assemblies (e.g. circuit board) / Compliance with the instruction

※ Note: Warranty is voided if battery is replaced by unauthorized personnel.(When batteries require replacement, please contact the authorized personnel)

Instructions

- Risk of short circuit if battery is incorrectly installed/stored.
- Check that hands are dry before and at all times during the replacement process.
- Keep batteries away from children and infants.
- Do not heat, charge, bend, drop, short-circuit and/or disassemble battery.
- Do not mix together used and new batteries or different battery types.

※ Note: Battery rarely has minor stain or leak.

Steps

1. Open the battery cover.
2. Take out the batteries.
3. Put in the new batteries.
4. Check the batteries direction.
5. Put back in the battery cover.

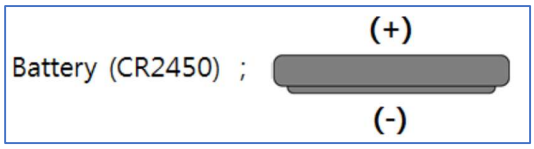
Battery Direction

Top: (+) Positive

Positive

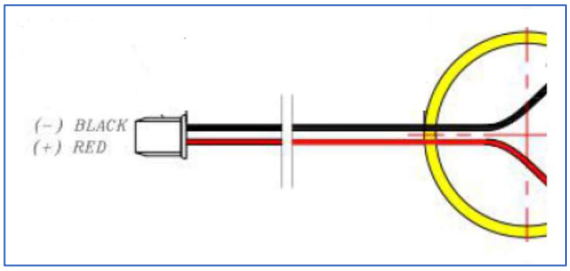
Bottom: (-) Negative

(-) Negative



Red Wire: (+)

Black Wire:



2. Battery Handling Guide

2.1 Avoiding hazards in lithium battery handling

1. Do not short circuit (Fig. 1)

- Direct connection of plus (+) and minus (-) poles may result in leakage, heat generation, explosion and/or fire.
- Do not store and/or carry batteries with metallic items, such as a necklace.

2. Do not stack and/or jumble batteries (Fig. 2)

- Stacked and/or jumbled batteries may cause a short circuit and/or forced discharge from contact with other batteries.
- This may result in leakage, heat generation, explosion and/or fire.

3. Do not make forced discharge batteries (Fig. 3)

- On a forced discharge by an external power source, the battery voltage goes to negative and this causes gas generation inside of the battery.
- This may result in leakage, heat generation, explosion and/or fire.

4. Do not dispose of batteries in fire

- Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

5. Do not heat batteries

- Heating batteries above 100℃/212°F may damage the resin in crimping, separator and other parts, potentially causing an electrolyte leak, internal short circuit, fire and/or explosion.

6. Do not solder directly onto batteries

- Direct soldering onto batteries may damage the resin in crimping, separator and other parts, potentially causing an electrolyte leak, internal short circuit, fire and/or explosion.

7. Do not recharge batteries

- Recharging of batteries may result in internal gas generation, causing electrolyte leak, battery swelling, fire and explosion.

8. Do not disassemble batteries

- Disassembly of batteries may generate gas that may irritate your throat.
- Lithium may also react with moisture to generate heat and fire.

9. Do not deform batteries

- Applying extreme pressure to batteries may cause deformation of the crimping and internal short circuit, causing electrolyte leak, battery swelling, fire and explosion.

10. Do not mix different type batteries

- For some applications, mixing different types of batteries or new and old batteries, can cause an over discharge due to differences in voltage and discharge capacities.
- This may lead to the risk of swelling and/or explosion.

11. Do not insert batteries with opposite polarity

- For some applications, battery insertion with opposite polarity (reverse insertion of plus and minus) may result in leakage, heat generation, explosion and/or fire.

※ *Please ensure the above precautions are strictly observed by related divisions including production, warehouse, product technology, sales, quality, customer stores, S/I companies, part-time workers, and external service companies.*

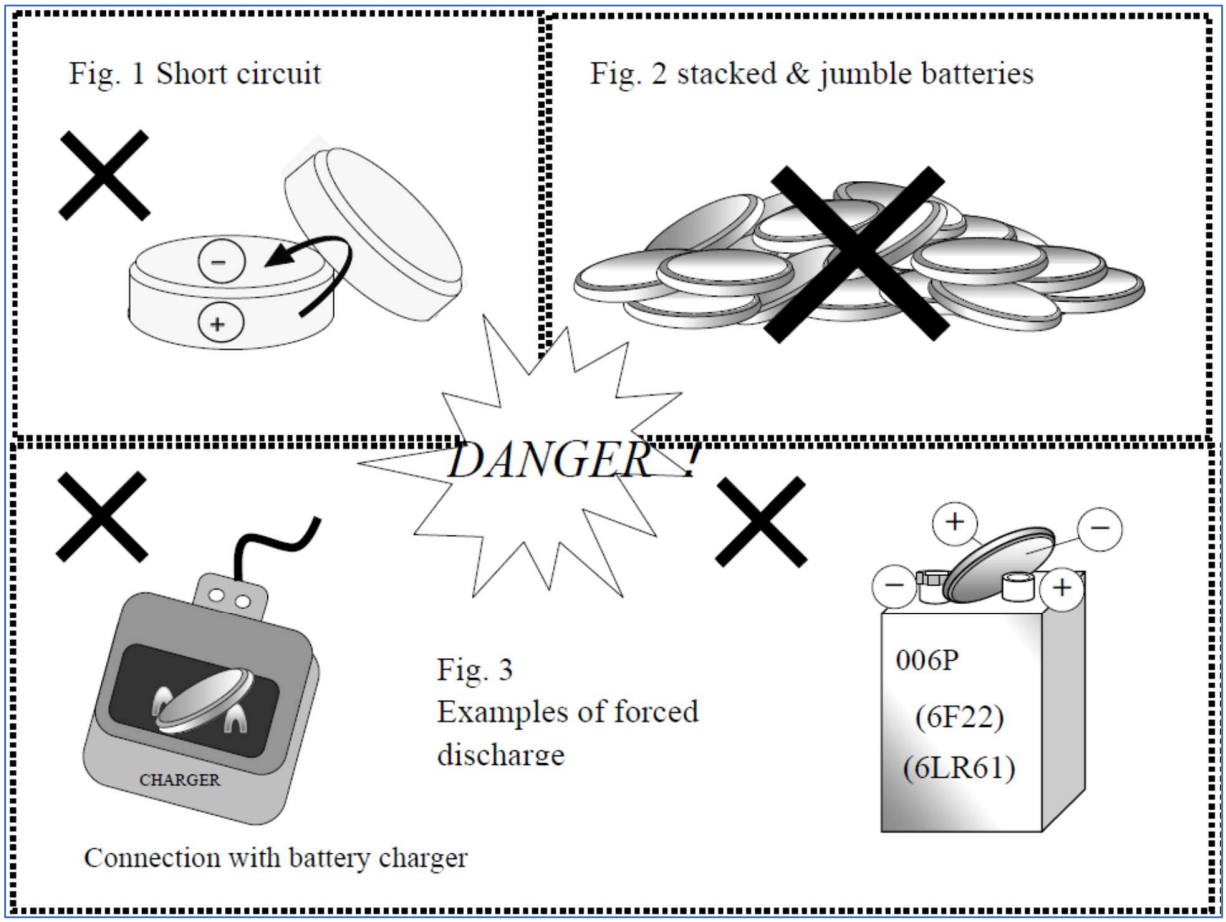
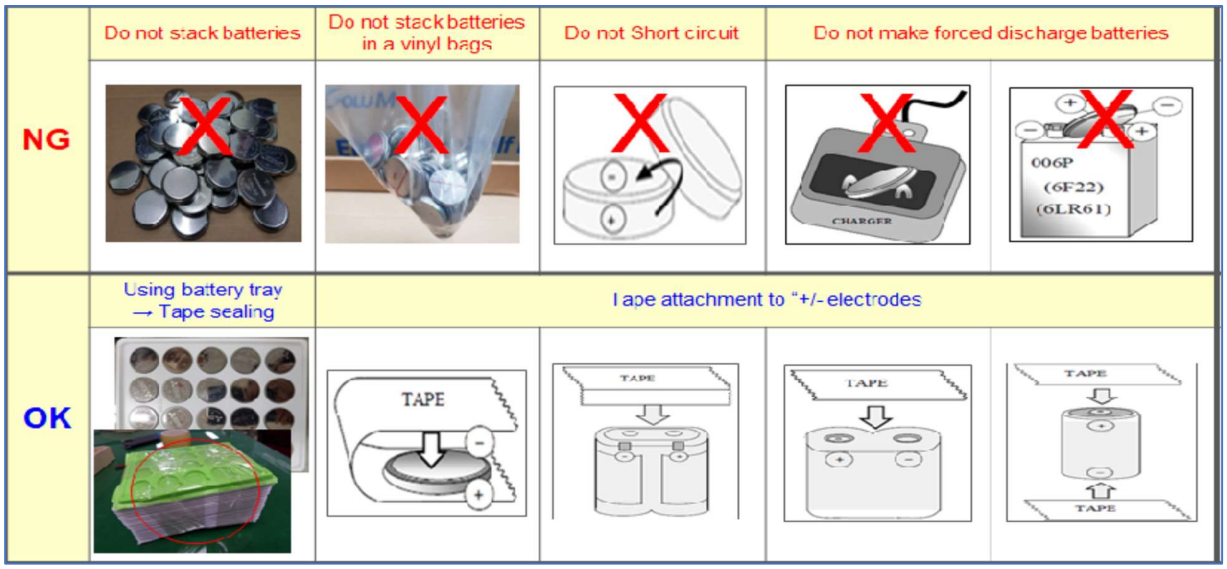


Fig. 3
Examples of forced discharge

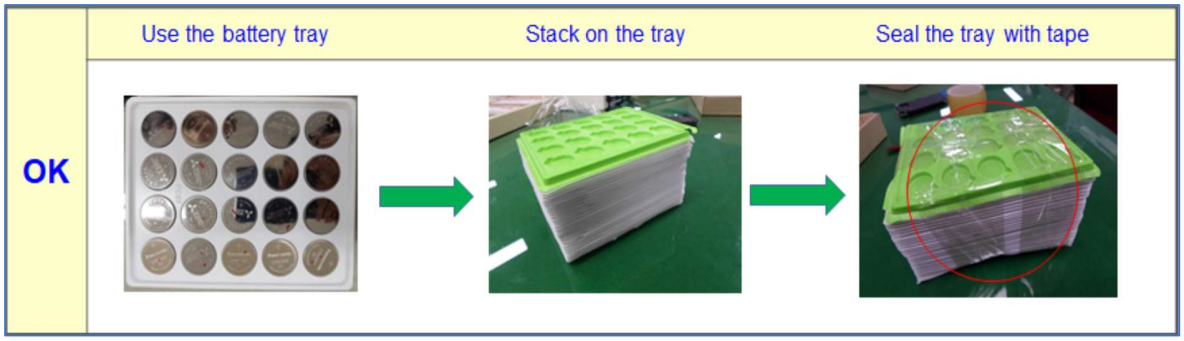
Connection with battery charger

2.2 Proper Storing and Disposing of Lithium Batteries

- To minimize risks of fire and explosion of batteries, be sure to follow the instructions below.



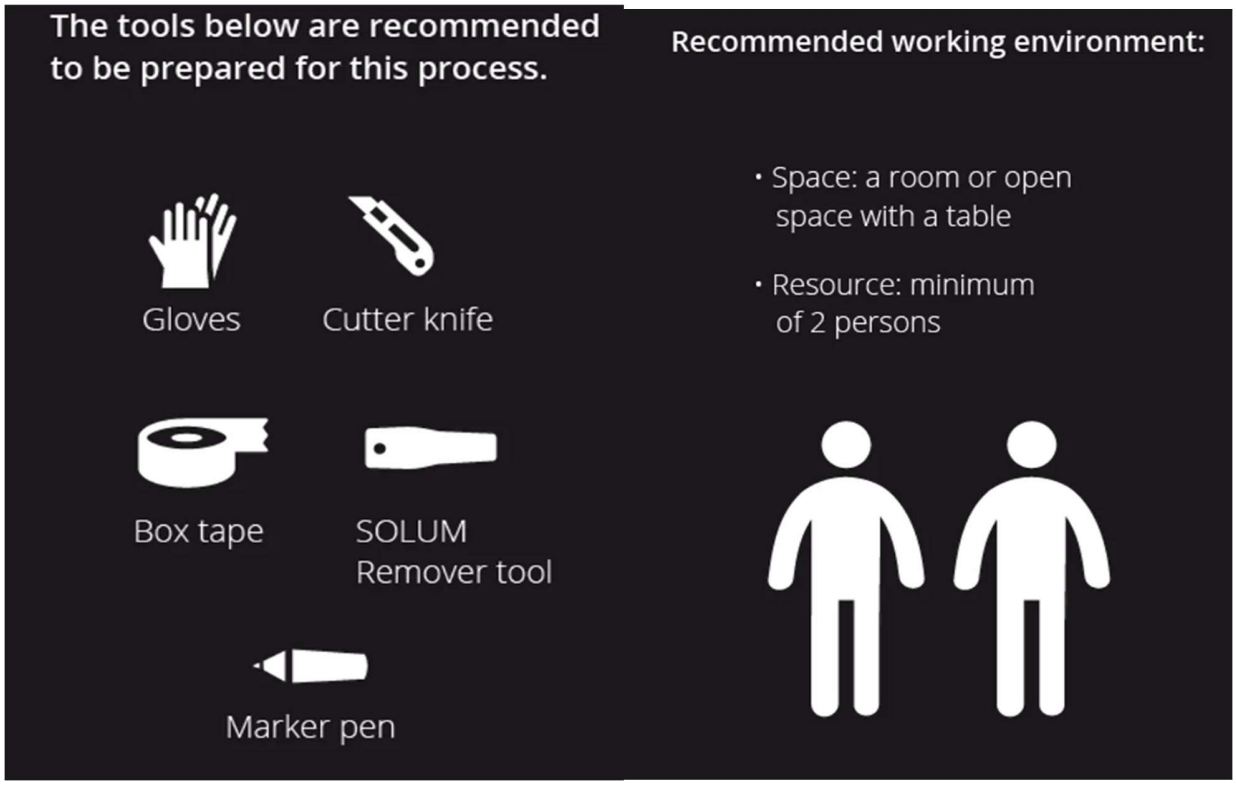
- Proper use of battery tray is outlined below.
- With batteries properly placed into each tray slot
- stack the trays in the same orientation
- use an empty tray on the top stack
- Tape the stack together to avoid falling apart.
- Follow local regulations for proper battery disposal guideline.



3. Standard Practices/ procedure to be followed in day-to-day operations of ESL

1. Avoid heat and fire.
2. Recommended storage conditions are dry and cool away from direct sunlight.
3. Please use the special battery pack provided by the dealer.
4. When replacing the battery. Please contact the after-sales service and get instructions.
5. IR67-Rating - Water and Dustproof- Designed for commercial environments, the Solum labels are encased in an IP67-rated enclosure. This gives it protection against potential damage caused by both dust and water. Though do not try to put it in deep water and dust knowingly.
6. Serial number / tags of the Solum ESL should not be altered, tampered with or removed. The product should not be tampered with, subject to misuse, negligence and damage while in improper handling. Do not remove/omit original technical markings, seals, serial numbers or similar markings.
7. The product should not undergo repairs, modifications or dismantled by any other person / agency. It should only be managed by an authorized service partner with records and approvals. Have the labels serviced by a qualified authorized solum technician/agency only.
8. The defects/ damage can be caused by household pests such as lizards, rats, cockroaches. Please take proper action if stores have these creatures.
9. Please make sure to operate the tags within the operating temperature range mentioned in the product catalog. The temperature may range and vary based on ESL type and size.

10. Battery should be changed under provision supervision using the right tool, proper battery type and wattage/voltage.
11. Please make sure to operate the tags within the operating humidity range mentioned in the product catalog.
12. The ESLs should be durable and fixed in place (i.e., don't use magnets or labels that can be easily moved). Use specified rails and accessories only.
13. The Solum ESL should be mounted so as not to obstruct normal activity or get easily ripped off or damaged.
14. Before ESL is applied / hung, make sure that the surface is clean. Don't use / stick with glue or duct tape.
15. Place it on a rack such that to avoid cart collision. This may damage the cover and screen.
16. Please take considerate precautions while product fillings in the rack. The ESL should not be frequently touched, collided or dropped.
17. Pressure range should be considered while storing, installation and after installation.
18. If ESL is unused, please take considerate storage guidelines as mentioned. In room temperature, dry place and do not put load on ESL while in storage.
19. Please use appropriate tools and workforce as mentioned below in explanatory diagram.



20. Rail acts as a barrier between your electronic shelf labels and direct cart impact. Use only proper assigned rails. Do not force rails into esl if it does not fit. This may damage the esl and rails as well.
21. Do not drop from over 70 cms for esl size > 4.2” & 100 cms for esl < 4.2”.
22. Do not expose the ESL to moisture or liquids. ESLs are not fully waterproof (upto certain depth) and can be damaged by moisture or liquids. If an ESL gets wet, it should be wiped dry immediately. Do not try to open it.
23. Do not expose the ESL to extreme temperatures. ESLs are designed to operate within a specific temperature range. If an ESL is exposed to

extreme temperatures, it may not function properly or may be damaged.

24. Do not disassemble the ESL. The ESL is a sealed unit and should not be disassembled. Disassembling the ESL may void the warranty and could damage the device.
25. Clean the ESL regularly. The ESL should be cleaned regularly to remove dirt, dust, and fingerprints. A soft, damp cloth can be used to clean the ESL. Do not use harsh chemicals or abrasive cleaners. Use a soft, lint-free cloth to clean the display surface of the electronic shelf labels (ESLs) regularly. Gently wipe the surface to remove dust, fingerprints, or any other smudges.
26. Contact the authorized service provider or manufacturer for assistance if you have any problems with the ESL. The manufacturer can provide assistance with troubleshooting and repair of the ESL
27. If a label is damaged, do not attempt to repair it yourself. Contact a qualified technician for assistance.
28. Do not allow loads to be applied directly to esl products while they are in storage.
29. Handle exterior/interior packing boxes carefully. Note that a physical shock or dropping the product can cause product damage.
30. Do not ever try to open the cover/boards/circuit or try to repair by yourself. IT may damage the seal, internal circuits and epaper/e-ink boards as well
31. Please keep it away from frequent smoky, strong magnetic electrostatic felds, cosmic and radioactive rays
32. External impact range - Protective cover not applied(2.9”) > 9.55 Kgf / Apply protective cover(2.9”) : > 48.16 Kgf. i.e ESL should not be put into

environment/condition where vertical / horizontal fall impact is more than 10 cm with weight more than 30 gram

33. When the store product is taken out and loaded on the display rack, the tag is shocked and damaged
34. When removing/attaching Tag, excessive force is applied without using JIG, and when twisting damaged
35. Application of LCD Protection Cover to Lower Shelf for Impact Relief
36. By following these simple maintenance guidelines, you can help to ensure that your electronic shelf labels will last for many years.

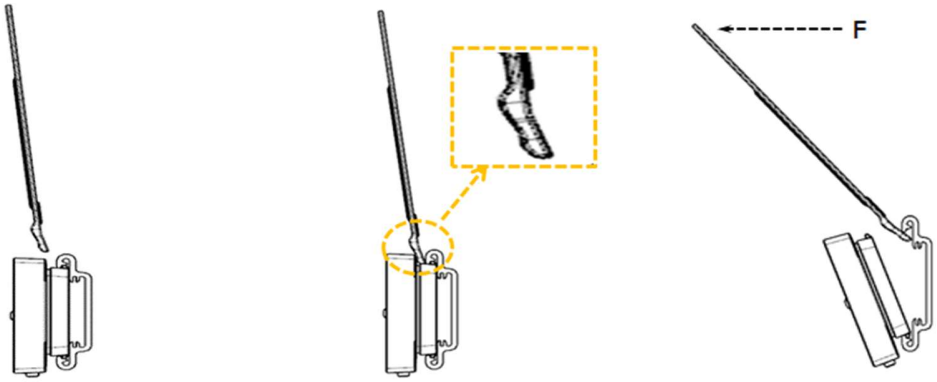
37. Battery Replacement:
    a. Follow the manufacturer's instructions for replacing batteries. Typically, this involves opening the battery compartment and swapping out the old batteries with fresh ones.
    b. Use high-quality batteries recommended by the manufacturer to ensure optimal performance.

38. Software Updates:
    a. ESLs often require software updates to enhance functionality, fix bugs, or improve compatibility.
    b. Check for software updates provided by the ESL manufacturer or vendor regularly.
    c. Follow the manufacturer's instructions to install software updates correctly and avoid any potential disruptions in the ESL system.

39. Employee Training:

a. Train employees responsible for maintaining the ESLs on proper handling and maintenance procedures.
b. Educate them on how to clean the ESLs safely, replace batteries correctly, and identify basic issues that may require further attention.
c. Provide them with contact information for technical support or the manufacturer's customer service in case of any technical difficulties.

40. Remove ESL Tags from the display stand using JIG
41. Use tag remover only



4. Reliability Test done under standard tests conditions for ESL. (Newton Pro in this case).

**You can ask for a reliability test or data sheet / technical specifications for ESL you are using from the support team.*

1. High Temperature Operation
2. Low Temperature Operation
3. High Temperature/Humidity Operation
4. High Temperature Storage
5. Temperature Shock (Storage)
6. ESD
7. Package Drop Test
8. Package Random Vibration Test

Test Item	Test Condition	Pass Criteria
High Temp Resistance	60°C / 35%, 240hrs	Normal operation after test
High Temp Operation	40°C / 35%, 240hrs	
Thermal Shock	-25°C (for 30mins) ~ 60°C (for 30mins) for 240 cycles	
High Temp & Humidity Operation	40°C / 70%, 240hrs	
Low Temp Operation	Normal ESL: 0°C (240hrs) Freezer ESL: -25°C (240hrs)	
ESD Test	Air ±10KV, 150pF, 330Ω, 10 times/Point	
Water Proof (IEC60529)	Water Proof Test: 15cm x 15cm water tank, 1m depth of water, 30 minutes (IP68 criteria) for Newton Pro tags only	No water ingress into tag
RF Sensitivity (Communication Distance)	Gateway <-> Tag distance: 100 meters	Tag receives RF signal from Gateway.

The warranty does not cover defects that are due to operational wear and tear, operating errors and improper use, external influences (operation with the wrong type of current or voltage, connection to unsuitable power sources, fire, lightning, explosion or overvoltage caused. Please make sure to properly use and store the ESL as mentioned in this manual.