

SOLUM

Newton E-Paper 32" Frame

Datasheet

02/06/2025

Summary

This datasheet presents the general performance and specifications of Newton E-Paper 32" Frame for SOLUM Electronic Shelf Label (ESL) System.



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Document History

Rev.	Date	Revision History	Page
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v1.01	09/05/2025	Specification, Product Handling Precautions modification	8, 18
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v1.03	02/06/2025	Product Name modification	-

1. Preface

1.1. About This Guide

This datasheet presents the specification and general performance of SOLUM's Newton E-Paper 32" Frame.

1.2. Audience

This manual is intended for any user (IT, operations, store managers, installers, etc.) authorized to operate and install SOLUM ESLs.

1.3. Abbreviations and Acronyms

Terminology/Abbreviation	Description
GW	Gateway
ESL	Electronic Shelf Label
RF	Radio Frequency
IT	Information Technology
PoE	Power over Ethernet
TBD	To Be Decided

2. Overview

SOLUM Newton E-Paper 32" Frame is a component to a total SOLUM's ESL System. The SOLUM's ESL System consists of the ESLs, Gateway(s), Server, and optional accessories (such as the Newton Pro Remote Controller) and is used to electronically displays key information such as price and Product information, that are traditionally printed or written on paper in environments like supermarkets, warehouses, and factories.

Newton E-Paper 32" Frame that can create a full color image based on 6 colors. When installed in large stores and indoor spaces, it has the effect of attracting people's attention from a far. This signage can be hung on the ceiling in addition to wall-mounting or using a stand, so when applied to large supermarkets, customers can check discount events and promotional images from afar as they move around the store.



Figure 1. PRODUCT

3. Specification

This section details specification of Newton E-Paper 32" Frame.

3.1. Product Specification

Item	Description
Label Dimensions (W x H x D)	723.45 x 431.52 x 28.98 mm / 28.48 x 16.99 x 1.14 in
Display Dimensions (W x H)	696.02 x 389.68 mm / 27.40 x 15.34 in
Display Resolution	2,560 x 1,440 pixels (94 dpi)
Label Weight	5.0 kg / 176.37 oz (incl. Battery)
Viewing Angle	Nearly 180°
Display Colors	● ○ ● ● ● ● KWRYGB (Black, White, Red, Yellow, Green, Blue) 65,000 Colors Gamut
Battery	Battery Pack (CR2450 Lithium Battery x 4) Battery Pack (Lithium Rechargeable, 3,500mAh)
Wireless Communication	2.4 GHz Unlicensed ISM band for BLE physical layer with SOLUM Proprietary Protocol Wi-Fi Communication as 801.11a/b/g/n (2.4/5GHz) for download image data
Communication Distance	98 feet (30m) radius Line of Sight
Security	BLE: 128-bit AES Encryption Wi-Fi: SHA2-256
Operating Temperature	32°F ~ 113°F (0°C ~ 45°C) @45~70% RH
Storage Temperature	32°F ~ 113°F (0°C ~ 45°C) @45~70% RH
Product Marking Name	ESL Label
Firmware Version Identity Number	Version 36

3.2. Radio (RF) Specification

3.2.1. BLE RF Characteristics

Item	Parameter	Specification			Unit	Condition
		Min	Typ	Max		
Tx	Tx Power	-	4	-	dBm	
	[Carrier Frequency Offset and Drift]	-75	0	75	kHz	
	Tx Current	-	-	20	mA	Total current at max Tx Power
Rx	Receiver Sensitivity	-	-	-87	dBm	PER < 30.8%

3.2.2. Wi-Fi RF Characteristics

Item	Parameter	Specification			Unit	Condition
		Min	Typ	Max		
Tx	Frequency Range	2412	-	2484	MHz	Center Channel Frequency
		5180	-	5825	MHz	
	Transmit Output Power	-	16 14 13	18.5 16.5 15.5	dBm	802.11b, 11Mbps 802.11g, 54Mbps 802.11n HT20, MCS7
Rx	Center Frequency Tolerance	-25	-	+25	ppm	25°C
	Frequency Range	2412	-	2472	MHz	Center Channel Frequency
		5180	-	5825	MHz	
	Receiver Sensitivity	-	-	-76 -65 -64	dBm	802.11b, 11Mbps 802.11g, 54Mbps 802.11n HT20, MCS7

3.3. NFC Specification

Item	Parameter	Specification			Unit	Condition
		Min	Typ	Max		
NFC	Read Distance	-	0.7	-	in	
		-	20	-	mm	

NFC antenna location shown for each ESL size.

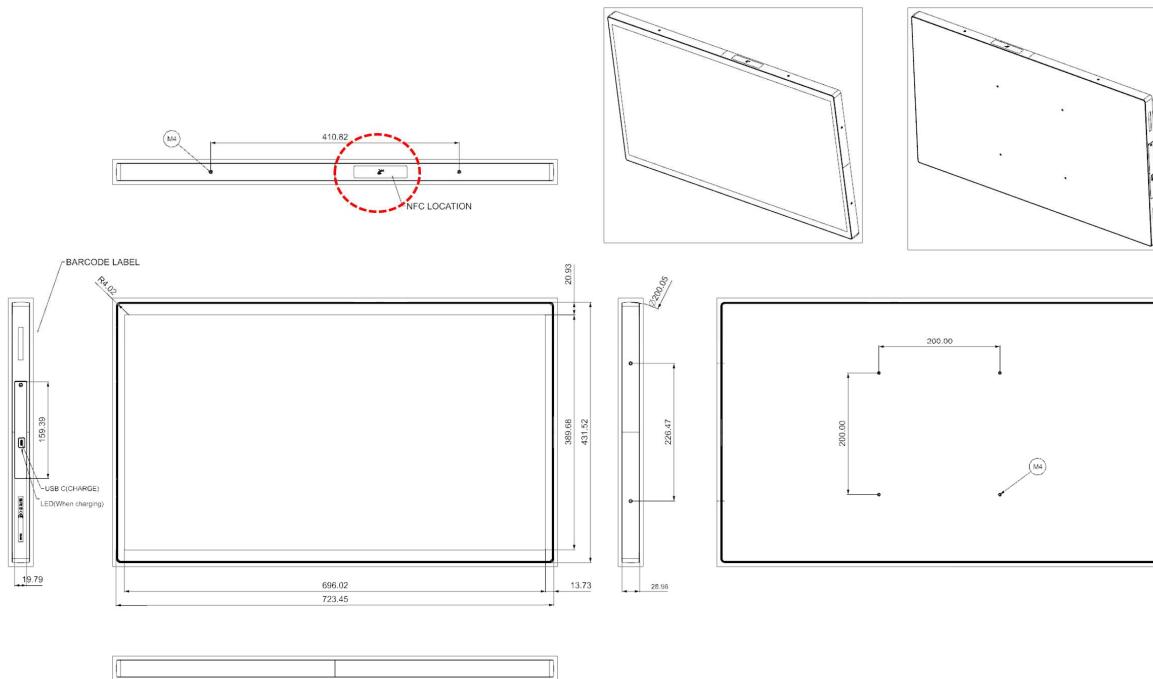


Figure 2. NFC LOCATION

3.4. Features

Some of the features of SOLUM ESL.

- Low power consumption
- 'Real time' update speed
- SOLUM Proprietary Protocol communication with SOLUM Gateway for added security

Item	Description
Usable Pages	3 pages
NFC	Built-in Felica NFC Forum Type 3
Housing Bezel Color	Black
Compatibility Supported	USB type-C for Battery Charging

3.5. Mechanical Drawing

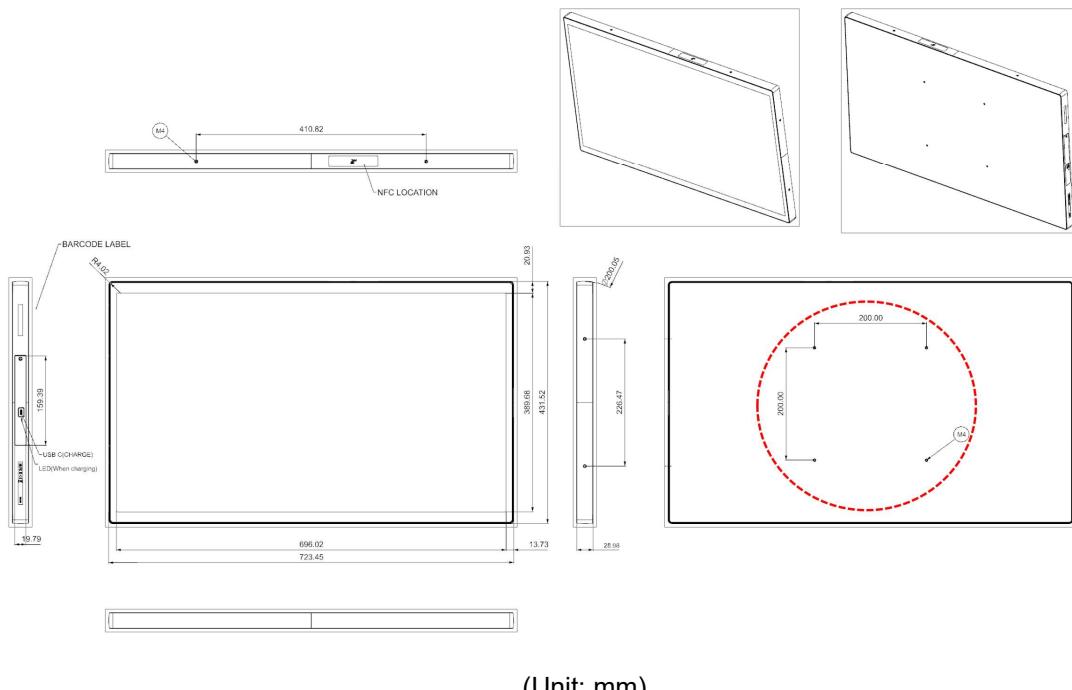


Figure 3. MECHANICAL DIMENSION

3.6. Label Marking

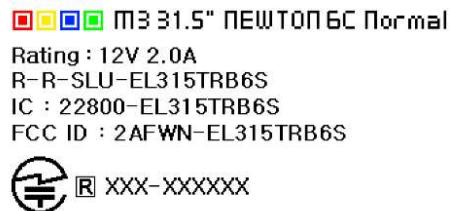


Figure 4. ESL E-LABEL

ESL specific information can be found on the screen E-label located on the left and top side of the ESL. Information displayed are but not limited to: IC, FCC ID, Model, Manufacturing Information, ESL Media Access and Control (MAC) Address.

Followings are steps to display the E-Label :

- Step1 : Remove the battery pack, install it, and start the mode
- Step2 : Screen on, E-label is active for 1 minute.

The MAC label is also attached to the side of the product.

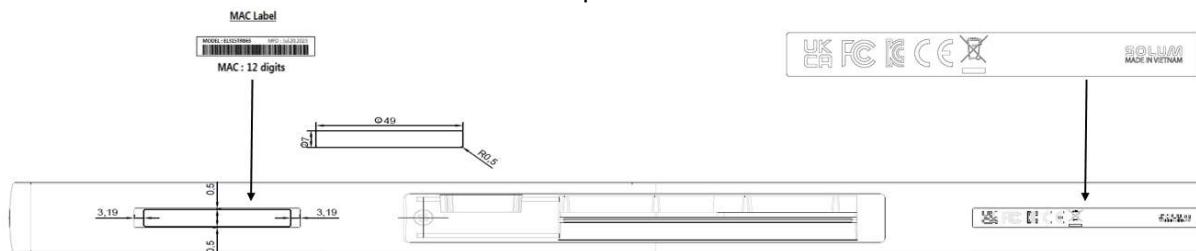


Figure 5. ESL LABELS (MAC)

3.7. Certifications

3.7.1 FCC

FCC Information to User

WARNING: This equipment may generate or use radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.7.2 ISED

ISED Information to User

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Attention: Tout changement ou modification non expressément approuvé par le fabricant peut annuler le droit de l'utilisateur à utiliser l'équipement.

exposition aux rayonnements radiofréquences. Pour se conformer aux exigences de conformité de l'exposition IC RF, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toutes les personnes.

This device complies with Industry Canada NRCs applicable to licence-exempt radio devices. The operation is authorized under the following two conditions: (1) the device shall not cause interference,

and (2) the user of the device shall accept any radio interference suffered, even if the interference is likely to compromise its operation.

Caution: Any change or modification not expressly approved by the manufacturer may void the user's right to use the equipment.

exposure to radiofrequency radiation. To comply with the ICRF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

-PMN(Product Marking Name) : ESL Label

-FVIN(Firmware Version Identity Number) : V36

3.7.3 CE

We hereby declare under our sole responsibility that the electrical product above is in compliance with the essential requirements of the Radio Equipment Directive (2014/53/EU) by application of

EN IEC 62368-1:2020+A11:2020

EN 62479:2010

EN 301 489-1 V2.2.0

EN 301 489-17 V3.2.0

EN 300 328 V2.2.2

and the Directive (2011/65/EU) on the restriction of the use of certain hazardous substances in electrical and electronic equipment by application of EN 62321 Series.

3.7.4 KC

인증 받은 자의 상호: 주식회사 솔루엠

제품명: 특정소출력 무선기기(무선데이터통신시스템용 무선기기)

모델명: EL315TRB6S

제조사: 주식회사 솔루엠

제조국: 한국, 베트남

인증번호: R-R-SLU-EL315TRB6S

제조년월일: 25. . .

4. Packaging

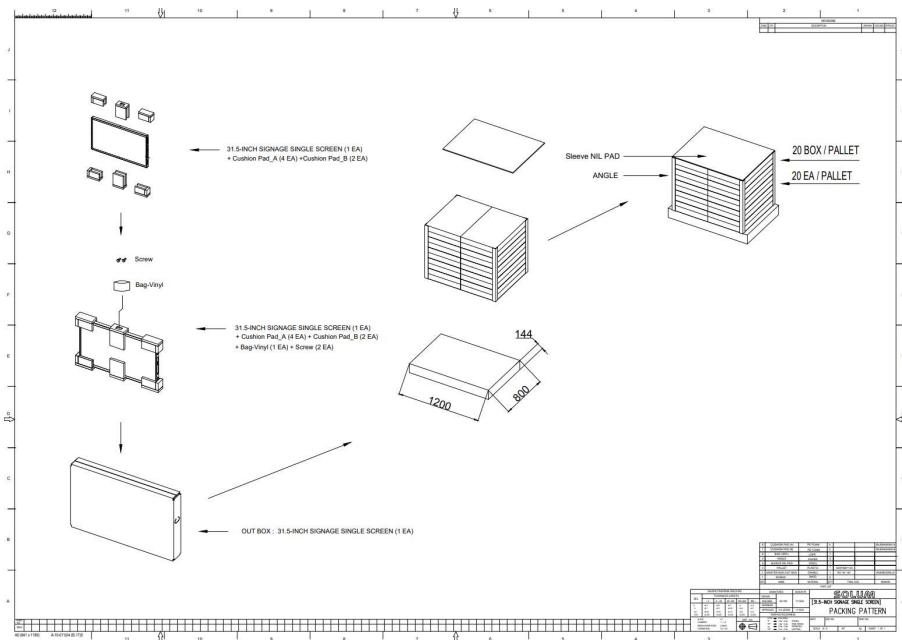


Figure 6. PACKING-DIAGRAM (1,200 X 800)

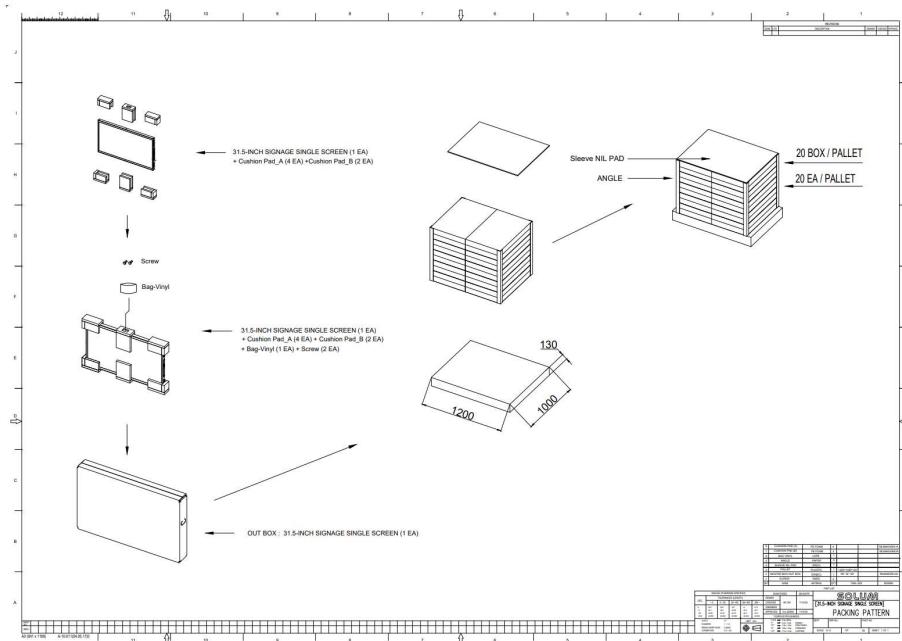


Figure 7. PACKING-DIAGRAM (1,200 X 1,000)

5. Reliability Test

- High Temperature Operation
- Low Temperature Operation
- High Temperature/Humidity Operation
- High Temperature Storage
- Temperature Shock (Storage)
- ESD
- Package Drop Test
- Package Random Vibration Test

Test Item	Test Condition	Pass Criteria
High Temp Resistance	60°C / 35%, 240hrs	
High Temp Operation	50°C / 35%, 240hrs	
Thermal Shock	-25°C (for 30mins) ~ 60°C (for 30mins) for 240 cycles	Normal operation after test
High Temp & Humidity Operation	50°C / 70%, 240hrs	
Low Temp Operation	0°C (240hrs)	
ESD Test	TYP. Air ±10KV, 150pF, 330Ω, 10 times/Point	
RF Sensitivity (Communication Distance)	TBD	Tag receives RF signal from Gateway

6. 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 ~ 113 °F (0°C ~ 45°C) @45~70% RH environment and should be installed within **90 days** of receipt.

6.1. 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.

6.2. 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°C~45°C/32°F~113°F (KWRYGB)**. 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°C/59°F for normal 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 and 5GHz 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)

6.3. Product Cleaning

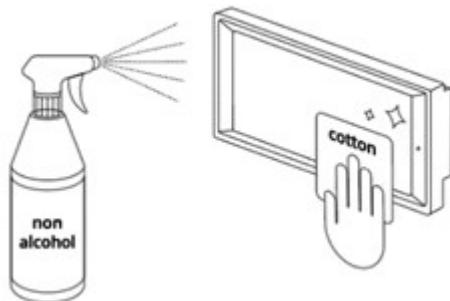
6.3.1. For Spray Cleaning:

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



6.3.2. For Wet Tissue Cleaning:

Steps

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



6.4. 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.

6.4.1. Battery Pack (CR2450 x 4) Replacement

Steps

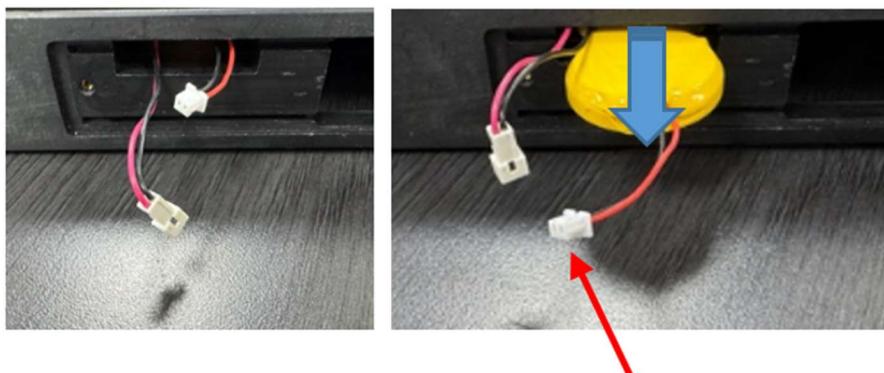
- (1) Remove the bolts and open the cover.



- (2) Pull out the battery pack cable.



- (3) Disconnect the cables. Unplug the connected cable by pulling on the indicated male connector. Remove the old battery and replace it with a new one.



- (4) Assembly is then completed in reverse order of removal.

Battery Direction

- Battery Pack
 - Red Wire: (+) Positive
 - Black Wire: (-) Negative

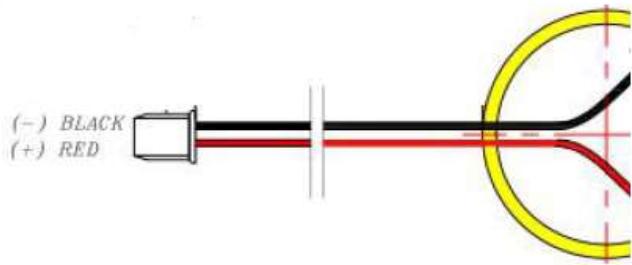


Figure 8. BATTERY PACK DIRECTION

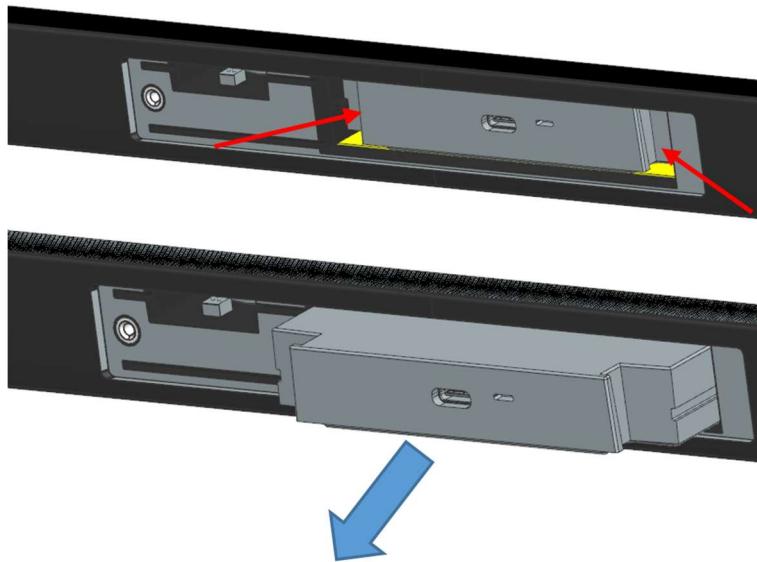
6.4.1. Battery Pack (Rechargeable, 3,500mAh) Replacement

Steps

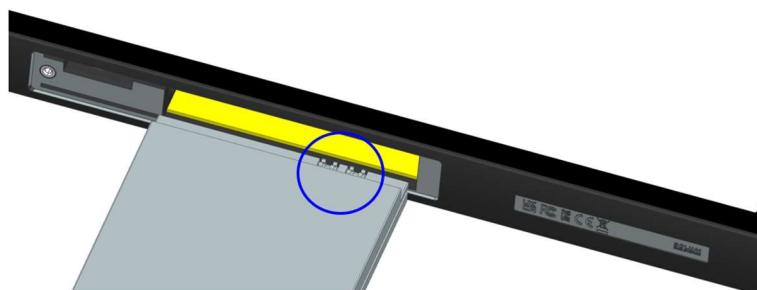
(1) Remove the bolts and open the cover.



(2) Hook your fingers on the left and right hooks (red arrows) and pull to remove the battery.



(3) To assemble, insert the new battery with the terminals facing upwards (push it in until you feel a click when inserting it). Assembly is then completed in reverse order of removal.



7. Battery Handling Guide

7.1. Avoiding hazards in lithium battery handling

1. Do not short circuit (Fig. 1)

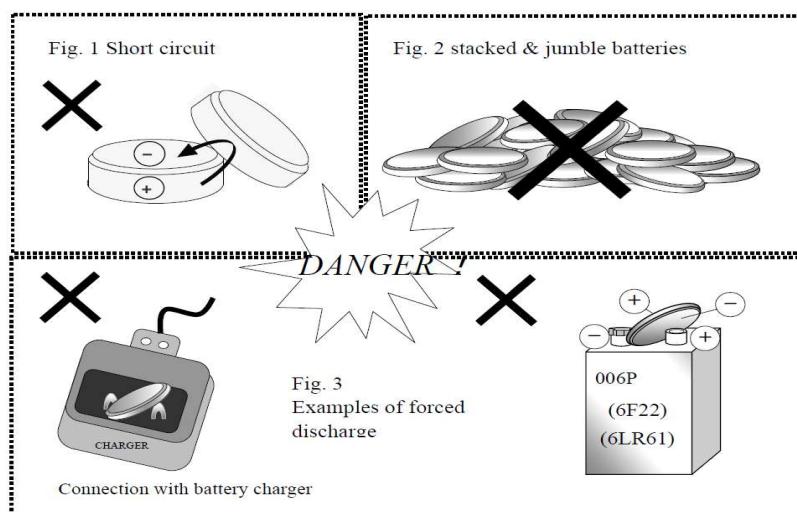
- Direct connection of plus (+) and minus (-) poles may result in leakage, heat generation, explosion and/or fire.
- Do not store and/or carry batteries with metallic items, such as a necklace.

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 in 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°C/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 non-rechargeable lithium batteries

- Recharging non-rechargeable 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.

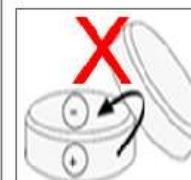
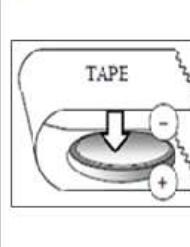
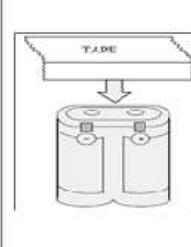
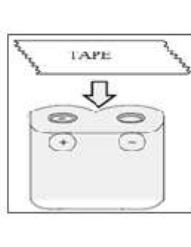
11. Do not insert batteries with opposite polarity

- 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.

7.2. Proper Storing and Disposing of Lithium Batteries

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

	Do not stack batteries	Do not stack batteries in a vinyl bags	Do not Short circuit	Do not make forced discharge batteries
NG	 A pile of batteries with a large red X over it.	 Batteries in a plastic bag with a large red X over it.	 A battery with a red X over it, connected to a metal loop.	 A battery in a charger with a red X over it.
	Using battery tray → Tape sealing			Tape attachment to "+/- electrodes
OK	 Batteries in a tray with a green tape seal.	 Diagram showing tape being applied to the positive terminal of a battery.	 Diagram showing tape being applied to the negative terminal of a battery.	 Diagram showing tape being applied to the top of a battery.

- 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.

	Use the battery tray	Stack on the tray	Seal the tray with tape
OK	 Batteries in a tray.	 Stack of trays.	 Stack of trays sealed with tape.

- Follow local regulations for proper battery disposal guideline.

7.3. Rechargeable Battery Handling

1. **Storage Warning: Battery should store and used away from static electricity.**
 - If battery is stored for a long time (more than 3 months), it should be stored in an environment with a temperature of 10°C to 25°C and a humidity of 45% to 85%.
 - If battery is stored for a long time (more than 3 months), it should be charged every three months.
 - Battery should be stored away from source of heat and avoid direct sunlight.
2. **Safety Warning: It is strictly forbidden to directly short circuit the positive and negative poles of this product. It is strictly forbidden to connect the positive and negative poles.**
 - Do not crush, puncture, decompose and burn the battery and shall not be heated more than 100°C, do not put the battery into water.
 - Charging beyond the overcharge voltage may result in an explosion or relief from the opening of the safety valve.
 - Do not force the battery to discharge, which may cause performance degradation or internal resistance increase.
 - Keep away from the battery immediately when it is found that the battery leaks or emits an unpleasant smell. If the electrolyte penetrates into the skin or clothes, wash immediately with clean water. If the electrolyte seeps out and enters your eyes, do not rub your eyes, immediately wash them with clean water and go to the hospital for examination.
3. **When charging the battery pack, make sure to use a USB-C Type charger with at least 15W of power.**
 - Using low-cost or fake brand chargers available on the market may cause damage to the product or even lead to fire hazards.
 - Please refer to the following list of approved chargers and use them accordingly.

Manufacturer	Watt	Port	Charging	Shape	Model Name
SOLUM	25W	1 Port	1C	Stripe	ADS025C1

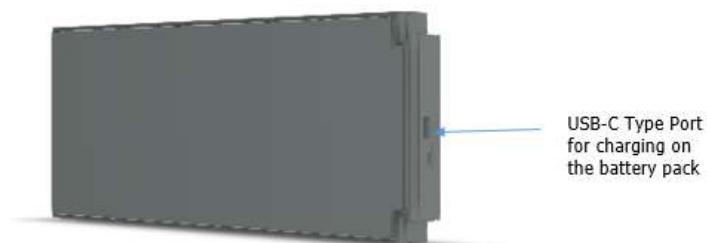


Figure 9. BATTERY PACK