MITSUBISHI ELECTRIC

TECHNICAL BULLETIN

CT-A-0001-A

Precautions for Transport Recommendations on Lithium Batteries

■Date of Issue

May 2020

■Relevant Models

LD-FX, LE-10WTA-GOT

Thank you for your continued support of Mitsubishi Electric tension controllers.

The 60th Edition of the IATA Dangerous Goods Regulations was issued on January 1, 2019, and there are some changes on the regulations.

This technical bulletin summarizes how to transport lithium batteries by air, based on the 60th Edition of the IATA Dangerous Goods Regulations. In the transportation regulation (hereinafter referred to as UN Recommendations), lithium batteries are classified into dangerous goods (Class 9) and non-dangerous goods according to the amount of lithium. Packaging methods of the batteries depend on the classification. For details, refer to the 60th Edition of the IATA Dangerous Goods Regulations.

The regulations in the IATA Dangerous Goods Regulations are reviewed and changed every year. A customer who transports lithium batteries is responsible for the package. Please check the latest Edition of the IATA Dangerous Goods Regulations and the UN Recommendations whenever transporting lithium batteries.

Note that the descriptions in this bulletin provide information as of April 2020.

1 CHANGE ON LITHIUN BATTERIES

January 2019

In the revision of January 1, 2019, only the following labels can be put on the packages to be transported by air.

☞ Page 10 Class 9 hazard label
☞ Page 9 Warning notice

When transporting lithium batteries on and after January 1, 2020, the required documents for checking the summary of the UN Recommendations test (Test Summary) must be prepared.

☞ Page 10 Battery safety test

January 2018

In the revision of January 1, 2018, the requirements for packaging of lithium metal batteries to be transported by air were added.

☞ Page 4 TRANSPORT GUIDELINES

January 2017

In the revision of January 1, 2017, the design of the label which is required on the packages to be transported by air has changed. (In the revision as of January 2019, the above content has been changed. (☞ Page 2 January 2019))

January 2015

Lithium metal batteries has been forbidden for transport aboard passenger aircraft since January 1, 2015.[*1*2]

*1 Lithium metal batteries transported as cargo are restricted to Cargo Aircraft Only. The change does not apply to lithium metal batteries transported by sea.

*2 The change does not apply to lithium metal batteries packed with equipment or contained in equipment.

January 2009

In the revision of January 2009, the regulations on transport of non-dangerous goods have been changed. (The regulations on transport of dangerous goods have not been changed.)

The following are the changes in the 50th Edition from the 44th Edition.

(1) A declaration for non-dangerous goods must be attached to a product for each shipment. The format depends on the carrier. Contact the carrier for the documentation.

(2) When only lithium batteries are packed or lithium batteries are packed with equipment, a drop test report must be submitted upon request from a carrier. A drop test must be performed by the shipper.

(3) A label showing a shipper's contact must be affixed.

(4) When a product is overpacked (including when multiple packages are packed in one), the package must be marked with the word "OVERPACK" and affixed with a handling label.

(5) When only lithium batteries are packed or lithium batteries are packed with equipment, the package is subject to the UN Recommendations independent of the number of batteries. (In the 44th Edition, the package is not controlled if the included number of batteries is within the allowable number.) Also, when lithium batteries are contained in equipment and packed, the package is subject to the UN Recommendations if the contained number of batteries are more than the allowable number. (In the 44th Edition, the package is not controlled independent of the number of batteries.)

2 MODELS SUBJECT TO THE UN RECOMMENDATIONS

The following table lists the models subject to the UN Recommendations among products of Mitsubishi Electric tension controllers. Batteries are classified in the following table depending on the product supply status (lithium batteries only, lithium batteries packed with equipment, lithium batteries contained in equipment).

Product supply status	Description
Lithium batteries only	Only lithium batteries are packed.
Lithium batteries packed with equipment	Lithium batteries and equipment are separated in the same package.
Lithium batteries contained in equipment	Lithium batteries are contained in equipment and packed.

For the batteries of the tension controllers used, refer to the manuals for each product.

2.1 When Only Lithium Batteries are Packed

Battery	Lithium content (g/product)	Weight (g/product)*1	Product using the battery
F_2-40BL	0.6	40	LD-FX
GT11-50BAT	0.15	7.2	LE-10WTA-GOT

*1 The weight is measured after the product is packed.

For the transport guidelines, refer to the following.

☞ Page 4 When Only Lithium Metal Batteries are Packed

2.2 When Lithium Batteries are Packed with Equipment

There are no corresponding products.

For the transport guidelines, refer to the following.

☞ Page 6 When Lithium Metal Batteries are Packed with Equipment

2.3 When Lithium Batteries are Contained in Equipment

Product	Battery
LD-FX	F_2-40BL
LE-10WTA-GOT	GT11-50BAT

For the transport guidelines, refer to the following.

☞ Page 7 When Lithium Metal Batteries are Contained in Equipment

3 EFFECTIVE DATES OF THE UN RECOMMENDATIONS

The following table lists the dates when the UN Recommendations are taken effect in each transport.

Transport	UN Recommendations	Start of enforcement
Air transport (ICAO*1/IATA*2)	Controlled	January 1, 2009 (50th Edition)
Sea transport (IMDG Code*3)	Controlled	January 1, 2004 (44th Edition)
Land transport (domestic)	Not controlled	—
Land transport (international)	Depends on regulations of each country.	Depends on regulations of each country. United States: October 1, 2004 Europe: July 1, 2003

*1 ICAO: International Civil Aviation Organization
*2 IATA: International Air Transport Association
*3 IMDG Code: International Maritime Dangerous Goods Code specified by IMO (International Maritime Organization)

4 TRANSPORT GUIDELINES

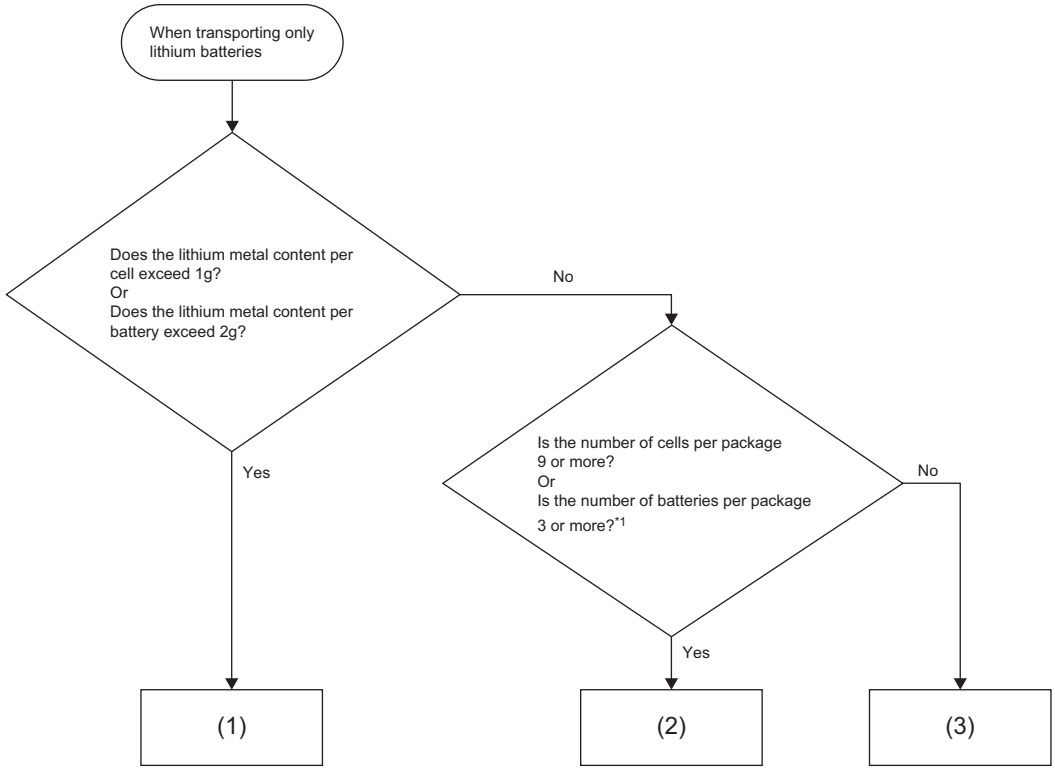
When a customer transports the Mitsubishi Electric tension controllers by means of transport subject to the UN Recommendations, pay attention to the descriptions in this chapter. Note that the packaging guidelines differ between dangerous goods and non-dangerous goods.

For the transportation subject to the UN Recommendations, refer to the following.

(☞ Page 3 EFFECTIVE DATES OF THE UN RECOMMENDATIONS)

4.1 When Only Lithium Metal Batteries are Packed

Use the following flowchart to take the necessary actions when transporting only lithium metal batteries.



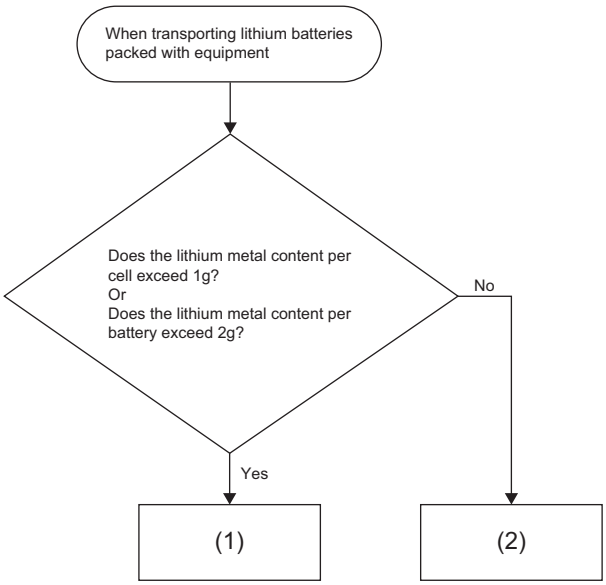
*1 When a cell or battery contains the lithium metal of 0.3g or less, select "No" regardless of the number of lithium batteries.

Item	(1)	(2)	(3)
Packaging requirements	Section IA	Section IB	Section II
Restrictions	Net weight of lithium batteries per package • Passenger aircraft: Prohibition of transport • Cargo aircraft: 35kg	Net weight of lithium batteries per package • Passenger aircraft: Prohibition of transport • Cargo aircraft: 2.5kg	• Passenger aircraft: Prohibition of transport • Up to one package per airway bill or HAWB • Lithium batteries must be carried into the aircraft separately from non-dangerous goods.
			Depending on the lithium content, the restrictions differ. ❶ Cell or battery of 0.3g or less • Number of cells and batteries per package: No restriction • Net weight of cells and batteries per package: 2.5kg ❷ Cell of more than 0.3g and 1g or less • Net weight of cells per package: 8 or less • Net weight of cells per package: No restriction ❸ Battery of more than 0.3g and 2g or less • Net weight of batteries per package: 2 or less • Net weight of batteries per package: No restriction Batteries described in the above ❶ to ❸ cannot be packed in the same package.

Item	(1)	(2)	(3)
Dangerous goods declaration	Required (☞ Page 10 Transport document)	Required (☞ Page 10 Transport document)	Not required (☞ Page 12 Transport document)
Airway bill (AWB)	Text of "Dangerous goods as per attached shipper's declaration" or "Dangerous goods as per attached DGD" and "Cargo Aircraft Only" or "CAO"	Text of "Dangerous goods as per attached shipper's declaration" or "Dangerous goods as per attached DGD" and "Cargo Aircraft Only" or "CAO"	Text of "Lithium metal batteries in compliance with Section Ⅱ of PI968" and "Cargo Aircraft Only" or "CAO"
Warning notice	1. Class 9 label for lithium batteries and CAO handling label 2. Mark as dangerous goods according to the requirements of DGR Chapter 7 ☞ Page 9 Warning notice	1. Class 9 label for lithium batteries, CAO handling label, and lithium battery mark 2. Mark as dangerous goods according to the requirements of DGR Chapter 7 ☞ Page 9 Warning notice	1. CAO handling label and lithium battery mark 2. Mark as required according to the PI968 Section Ⅱ (for overpack) ☞ Page 12 Warning notice
UN-approved container	Must be a UN-approved container that meets the requirements of packing group Ⅱ	Not required (However, the container must have passed the 1.2m drop test.)	Not required (However, the container must have passed the 1.2m drop test.)
Packed with different dangerous goods	Do not pack a lithium battery in the same outer package with dangerous goods classified in Class 1 other than Division 1.4S (explosives), Division 2.1 (flammable gas), Class 3 (flammable liquid), Division 4.1 (flammable solid) or Division 5.1 (oxidizing substances).	Do not pack a lithium battery in the same outer package with dangerous goods classified in Class 1 other than Division 1.4S (explosives), Division 2.1 (flammable gas), Class 3 (flammable liquid), Division 4.1 (flammable solid) or Division 5.1 (oxidizing substances).	Do not pack a lithium battery in the same outer package with other dangerous goods.
Overpack	Do not place a lithium battery in the same overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S (explosives), Division 2.1 (flammable gas), Class 3 (flammable liquid), Division 4.1 (flammable solid) or Division 5.1 (oxidizing substances).	Do not place a lithium battery in the same overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S (explosives), Division 2.1 (flammable gas), Class 3 (flammable liquid), Division 4.1 (flammable solid) or Division 5.1 (oxidizing substances).	• Up to one package per overpack • Do not place a lithium battery in the same overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S (explosives), Division 2.1 (flammable gas), Class 3 (flammable liquid), Division 4.1 (flammable solid) or Division 5.1 (oxidizing substances).
Shipper-loaded ULD	Not allowed	Not allowed	Not allowed
Three-digit code for dangerous goods (IMP CODE)	RBM (applied to the lithium metal batteries classified in the Section IA and IB)	RBM (applied to the lithium metal batteries classified in the Section IA and IB)	EBM (applied to the lithium metal batteries classified in the Section Ⅱ)

4.2 When Lithium Metal Batteries are Packed with Equipment

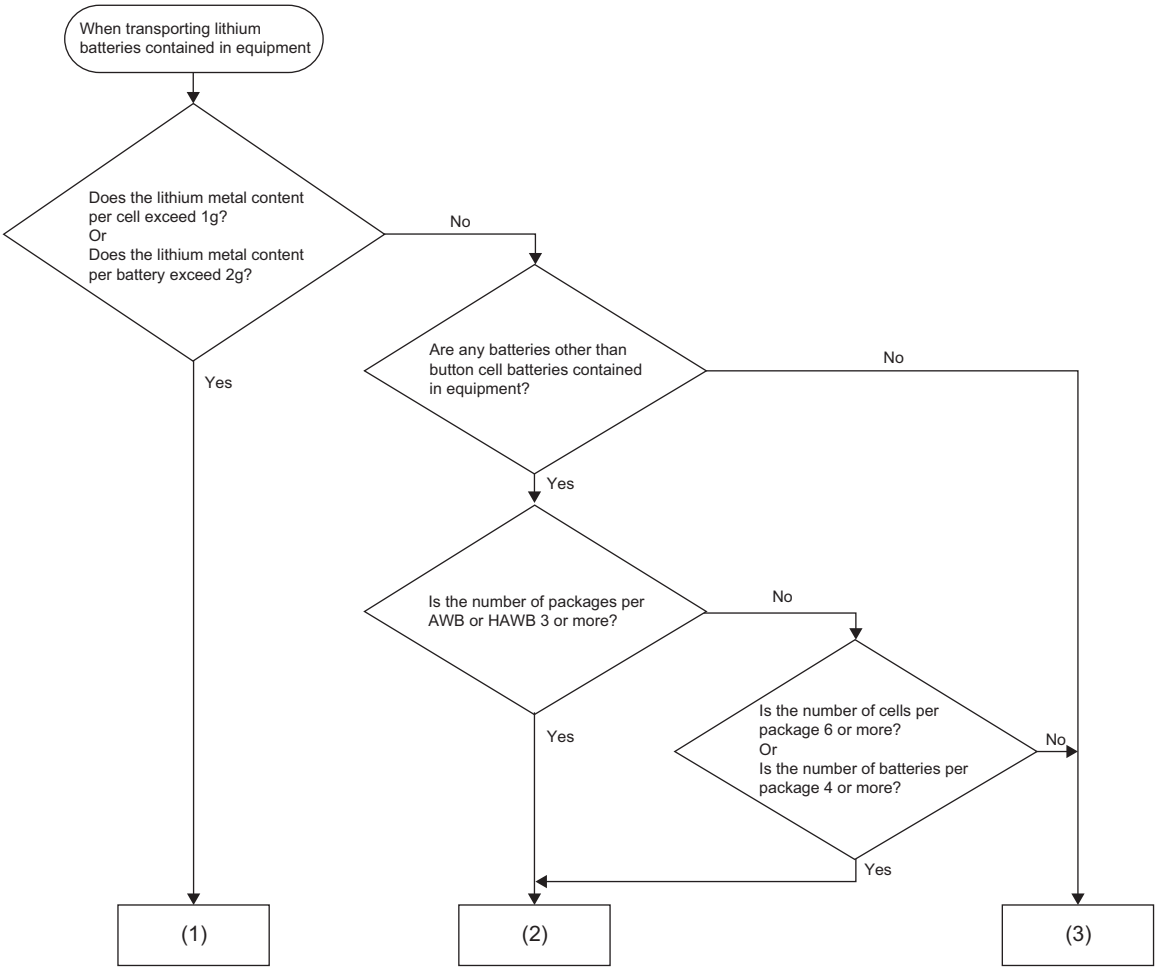
Use the following flowchart to take the necessary actions when transporting lithium metal batteries packed with equipment.



Item	(1)	(2)
Packaging requirements	Section Ⅰ	Section Ⅱ
Restrictions	The number of lithium batteries per package is the proper number of lithium batteries to operate equipment and up to two spare lithium batteries. Also take into account the net weight of lithium batteries per package. • Passenger aircraft: 5kg • Cargo aircraft: 35kg	The number of lithium batteries per package is the proper number of lithium batteries to operate equipment and up to two spare lithium batteries. Also take into account the net weight of lithium batteries per package. • Passenger aircraft: 5kg • Cargo aircraft: 5kg
Dangerous goods declaration	Required (☞ Page 10 Transport document)	Not required (☞ Page 12 Transport document)
Airway bill (AWB)	Text of "Dangerous goods as per attached shipper's declaration" or "Dangerous goods as per attached DGD"	Text of "Lithium metal batteries in compliance with Section Ⅱ of PI969"
Warning notice	1. Class 9 label for lithium batteries 2. Mark as dangerous goods according to the requirements of DGR Chapter 7 ☞ Page 9 Warning notice	1. Lithium battery mark 2. Mark as required according to the PI969 Section Ⅱ (for overpack) ☞ Page 12 Warning notice
UN-approved container	The container in which lithium batteries are packed must be a UN-approved container that meets the requirements of packing group Ⅱ. (In addition, when transporting aboard passenger aircraft, non-flammable and non-conductivity cushioning materials and metal intermediate or outer container must be used.)	Not required (however, the container in which lithium batteries are packed must have passed the 1.2m drop test.)
Shipper-loaded ULD	Not allowed	Allowed (A lithium battery mark is also required on the outside of the ULD.)
Three-digit code for dangerous goods (IMP CODE)	RLM (applied to the lithium metal batteries which are classified in the Section Ⅰ and packed with or contained in equipment)	ELM (applied to the lithium metal batteries which are classified in the Section Ⅱ and packed with or contained in equipment)

4.3 When Lithium Metal Batteries are Contained in Equipment

Use the following flowchart to take the necessary actions when transporting lithium metal batteries contained in equipment.



Item	(1)	(2)	(3)
Packaging requirements	Section Ⅰ	Section Ⅱ	Section Ⅱ
Restrictions	Lithium metal content per lithium battery • Cell: 12g or less • Battery: 500g or less Also take into account the net weight of lithium batteries per package. • Passenger aircraft: 5kg • Cargo aircraft: 35kg	Net weight of lithium batteries per package • Passenger aircraft: 5kg • Cargo aircraft: 5kg	Net weight of lithium batteries per package • Passenger aircraft: 5kg • Cargo aircraft: 5kg
Dangerous goods declaration	Required (☞ Page 10 Transport document)	Not required (☞ Page 12 Transport document)	Not required (☞ Page 12 Transport document)
Airway bill (AWB)	Text of "Dangerous goods as per attached shipper's declaration" or "Dangerous goods as per attached DGD"	Text of "Lithium metal batteries in compliance with Section Ⅱ of PI970"	Not required Do not describe the text of Section Ⅱ on the AWB.
Warning notice	1. Class 9 label for lithium batteries 2. Mark as dangerous goods according to the requirements of DGR Chapter 7 ☞ Page 9 Warning notice	1. Lithium battery mark 2. Mark as required according to the PI970 Section Ⅱ (for overpack) ☞ Page 12 Warning notice	Not required
UN-approved container	Not required	Not required	Not required
Shipper-loaded ULD	Not allowed	Allowed (A lithium battery mark is also required on the outside of the ULD.)	Allowed

Item	(1)	(2)	(3)
Three-digit code for dangerous goods (IMP CODE)	RLM (applied to the lithium metal batteries which are classified in the Section Ⅰ and packed with or contained in equipment)	ELM (applied to the lithium metal batteries which are classified in the Section Ⅱ and packed with or contained in equipment)	—

5 REGULATION OVERVIEW

5.1 Dangerous Goods Regulations

This section describes regulations on dangerous goods.
For details, refer to the IATA Dangerous Goods Regulations.

Packaging specifications

The specifications must comply with the Packing Instructions 968, 969, and 970 in the 50th Edition of the IATA Dangerous Goods Regulations.
Depending on the packaging status, how to handle lithium metal batteries as dangerous goods differs. For details, refer to the following.

Packaging	Packaging requirements	Reference
Lithium batteries only	Section IA, Section IB	Page 4 When Only Lithium Metal Batteries are Packed
Lithium batteries packed with equipment	Section I	Page 6 When Lithium Metal Batteries are Packed with Equipment
Lithium batteries contained in equipment	Section I	Page 7 When Lithium Metal Batteries are Contained in Equipment

Packaging certification

The packaging certification (UN3090, UN3091) must be obtained from the authority. For details on a test for the certification, contact the authority.
However, the certification is not required when a UN-approved container is purchased from a manufacturer.
Packaging when lithium batteries are contained in equipment depends on the carrier.
For details, contact the carrier.

Warning notice

The UN mark and UN container marking must be described and affixed and the Class 9 hazard label must be affixed on the outer packaging.
Packaging when lithium batteries are contained in equipment depends on the carrier.
For details, contact the carrier.

■UN mark

This mark is granted by the authority.

■UN container marking

Describe the following information on the UN container marking.

- "Lithium battery" in the PROPER SHIPPING NAME field
- "UN3090" for transportation of lithium batteries only or "UN3091" for transportation of lithium batteries packed with or contained in equipment in the UN NO. field
- The name and address of the shipper and consignee in the SHIPPER and CONSIGNEE fields, respectively

■Class 9 hazard label

For how to obtain this label, contact the authority.

Minimum dimensions: 100mm high, 100mm wide

Transport document

The Shipper's Declaration for Dangerous Goods must be attached to a package for each shipment.
For details, contact the carrier.

Battery safety test

All transported lithium batteries must pass the safety test specified by the UN. The lithium batteries for tension controller products listed in the following page have passed the safety test. No actions need to be taken by the customer.
☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS
When transporting lithium batteries, obtain the required documents from our company to check the summary of the UN Recommendations test (Test Summary). (required from January 1, 2020)

5.2 Non-dangerous Goods Regulations

This section describes regulations on non-dangerous goods.
For details, refer to the IATA Dangerous Goods Regulations.

Packaging specifications

Except lithium batteries contained in equipment, lithium batteries and equipment must be individually separated in an inner packaging and they must be packed with strong outer packaging so that the batteries can be protected against external short circuit.
Depending on the packaging status, how to handle lithium metal batteries as dangerous goods differs. For details, refer to the following.

Packaging	Packaging requirements	Reference
Lithium batteries only	Section Ⅱ	Page 4 When Only Lithium Metal Batteries are Packed
Lithium batteries packed with equipment	Section Ⅱ	Page 6 When Lithium Metal Batteries are Packed with Equipment
Lithium batteries contained in equipment	Section Ⅱ	Page 7 When Lithium Metal Batteries are Contained in Equipment

Packaging certification

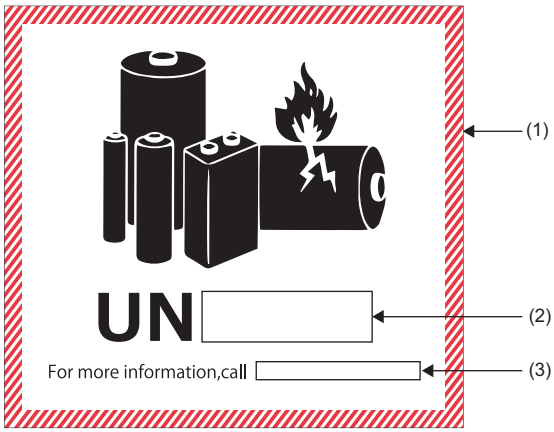
Except lithium batteries contained in equipment, each package must be capable of withstanding a 1.2m drop test in any orientation (self-certification is allowed.) without:

- Damages to lithium batteries contained therein;
- Shifting of the contents so as to allow battery to battery contact;
- Release of contents.

Upon a request from a carrier, a drop test report must be submitted. When only lithium batteries are packed or lithium batteries are packed with equipment, a drop test must be performed on the package and a drop test report must be created. For details, contact the carrier.

Warning notice

Affix the below shown handling label specified in the 50th Edition of the IATA Dangerous Goods Regulations on the surface of each outer packaging. (Describe a shipper's phone number available for 24 hours.) The label must be affixed on outer packaging of each package that passed a drop test (including individual packaging boxes shipped by us) and to outer packaging after overpack. If individual packaging box is too small to affix the label on, affix the label on the outer packaging only.



(1) The hatching must be red and the minimum width must be 5mm.
(2) Describe the UN number on the label.
- Lithium batteries only: UN3090
- Lithium batteries packed with equipment: UN3091
- Lithium batteries contained in equipment: UN3091

Note: When one or more packages are placed into an overpack, all the applicable numbers must be described.
(3) Describe a sender's phone number available for 24 hours.

Minimum dimensions: 110mm high, 120mm wide
For details, contact the carrier.
When lithium batteries are contained in equipment and the number of lithium batteries (cell) in one package is less than five, the warning notice and the transport document are not required.

Transport document

A declaration for non-dangerous goods must be attached to a package for each shipment with the following information.
- Inclusion of lithium batteries in the package
- Corrective actions when the package is impacted

Format of the document depends on a carrier.
For details, contact the carrier.
When lithium batteries are contained in equipment and the number of lithium batteries (cell) in one package is less than five, the warning notice and the transport document are not required.

Battery safety test

All transported lithium batteries must pass the safety test specified by the UN. The lithium batteries for tension controller products listed in the following page have passed the safety test. No actions need to be taken by the customer.
☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

Overpack

When a package including lithium batteries is overpacked with outer packaging (including when multiple packages are packed in one), the package will be regarded as an overpack and must be marked with the word "OVERPACK" on the outer packaging. (The marking is also required for a package that includes lithium batteries and equipment individually in an inner packaging and not subject to the UN Recommendations.)
When a package subject to the UN recommendations is overpacked, affix the handling label on the outer packaging.
(☞ Page 12 Warning notice)

REVISIONS

Version	Date of Issue	Revision
A	May 2020	First edition