



TECHNICAL BULLETIN

[ 1 / 12 ]

FA-A-0222-B

## Precautions for transport recommendations on lithium batteries

### ■Date of Issue

June 2017 (Ver. B: August 2018)

### ■Relevant Models

MELSEC-A/QnA/Q/L/QS series and MELSEC iQ-R series programmable controllers

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Thank you for your continued support of Mitsubishi Electric programmable controllers, MELSEC-A/QnA/Q/L/QS series and MELSEC iQ-R series.

Transport recommendations on lithium batteries (hereinafter UN Recommendations) have been revised and effective as of January 1, 2009. Accordingly, the corresponding part of the IATA Dangerous Goods Regulations has been changed from the 44th Edition to the 50th Edition.

This technical bulletin summarizes how to transport lithium batteries in compliance with the UN Recommendations by air, based on the 50th 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.

In the 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.

The 58th Edition of the IATA Dangerous Goods Regulations was issued on January 1, 2017, and there are some changes on the regulations. For details, refer to the IATA Dangerous Goods Regulations 58th Edition.

Note that the descriptions in this bulletin provide information as of October 2017.


## 1 Change on lithium batteries

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### January 2017

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In the revision as of January 1, 2017, design of the label which is required on the packages to be shipped by air has changed.

 Page 9 Class 9 hazard label

 Page 11 Warning notice

### January 2015

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Lithium metal batteries has been forbidden for transport aboard passenger aircraft since January 1, 2015.<sup>\*1\*2</sup>

\*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.

#### Point

If lithium batteries will be transported to, from, or through the United States by air, the batteries must comply with the regulations of the United States as well as the UN Recommendations. For air transport regulations on primary lithium batteries in the United States, refer to the following technical bulletin.

 Regulation on transportation of primary lithium batteries and relevant guidelines in the United States (FA-A-0221)

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### January 2009

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In the revision as 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 a 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 with referring to the following.

 Page 10 Packaging certification

(3) A label showing a shipper's contact must be affixed. Prepare the label referring to the following section. For details, contact the carrier.

 Page 10 Non-dangerous Goods Regulations

(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. For details, refer to the following.

 Page 10 Non-dangerous Goods Regulations

(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 for programmable controllers, MELSEC-A/QnA/Q/L/QS series and MELSEC iQ-R series. For the batteries of the programmable controllers used, refer to the manuals for each product.

Check the transport guidelines with referring to this table. (☞ Page 6 TRANSPORT GUIDELINES)

Product	Model	Packaging status	Battery type	Classification in transport
Q series battery	Q8BAT	Lithium batteries only	Lithium metal battery (battery)	Dangerous goods
	Q8BAT-SET	Lithium batteries packed with equipment		
Q/L series, MELSEC iQ-R series battery	Q7BAT	Lithium batteries only	Lithium metal battery (cell)	
	Q7BAT-SET	Lithium batteries packed with equipment		
A/QnA series battery	A8BAT	Lithium batteries only	Lithium metal battery (battery)	
Q/L/QS series, MELSEC iQ-R series battery	Q6BAT	Lithium batteries only	Lithium metal battery (cell)	Non-dangerous goods
A/QnA series battery	A6BAT			
MELSEC iQ-R series battery	FX3U-32BL			
K series battery	K6BAT			
Q series memory card battery	Q2MEM-BAT, Q3MEM-BAT			
AnS/QnA(S) series gateway set	Q6KT-NETGW-SS, Q6KT-NETGW-RS, Q6KT-NETGW-TS, Q6KT-NETGW-TB			
Q series CPU module	All models			
L series CPU module	All models	Lithium metal battery (A6BAT)	Lithium metal battery (Q6BAT)	
QS series CPU module	All models			
MELSEC iQ-R series CPU module	R04CPU, R04ENCPU, R08CPU, R08ENCPU, R08PCPU, R08PSFCPU, R08SFCPU, R16CPU, R16ENCPU, R16PCPU, R16PSFCPU, R16SFCPU, R32CPU, R32ENCPU, R32PCPU, R32PSFCPU, R32SFCPU, R120CPU, R120ENCPU, R120PCPU, R120PSFCPU, R120SFCPU			
Q series C Controller module	All models			
MELSEC iQ-R series C Controller module	R12CCPU-V		Lithium metal battery (cell)	
BOX Data Logger	NZ2DL		Lithium metal battery (Q6BAT)	
Q series network module	QJ71WS96, QJ71WS96-MES, QJ71MES96			
Q series memory card	Q2MEM-1MBS, Q2MEM-2MBS	Lithium batteries packed with equipment	Lithium metal battery (Q2MEM-BAT)	
	Q3MEM-4MBS, Q3MEM-8MBS		Lithium metal battery (Q3MEM-BAT)	
	Q3MEM-4MBS-SET, Q3MEM-8MBS-SET			
QnA(S) series memory card	Q1MEM-128S, Q1MEM-128SE, Q1MEM-1MS, Q1MEM-1MSE, Q1MEM-256S, Q1MEM-256SE, Q1MEM-2MS, Q1MEM-512S, Q1MEM-512SE, Q1MEM-64S, Q1MEM-64SE		Lithium metal battery (cell)	
Q series MELSECWinCPU module	Q10WCPU-W1-E, Q10WCPU-W1-CFE	Lithium batteries contained in equipment		

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The packaging status is defined as follows:

Packaging 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. (Example: The Q2MEM-BAT and Q2MEM-1MBS are separated in the same package.)
Lithium batteries contained in equipment	Lithium batteries are contained in equipment and packed. (Example: The Q6BAT is mounted on the R04CPU and packed.)

### 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 (as of January, 2009)	Start of enforcement
Air transport (ICAO <sup>*1</sup> /IATA <sup>*2</sup> )	Controlled	January 1, 2003 (44th Edition) January 1, 2009 (50th Edition)
Sea transport (IMDG Code <sup>*3</sup> )	Controlled	January 1, 2004 (44th Edition)
Land transport (domestic)	Not controlled	Not determined
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)

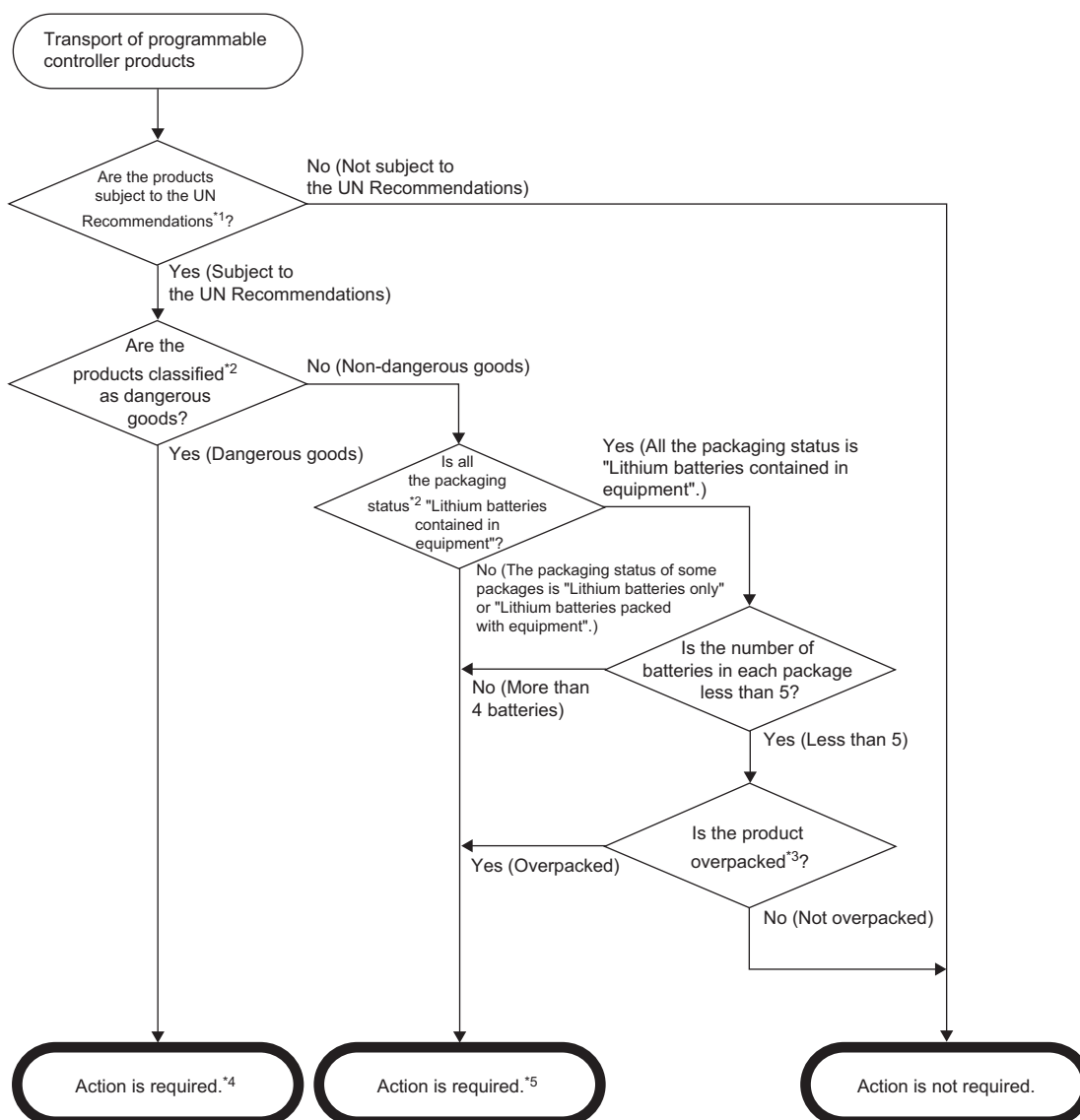
## 4 TRANSPORT GUIDELINES

When a customer transports the programmable controller (MELSEC-A/QnA/Q/L/QS series and MELSEC iQ-R series) product by means of transport subject to the UN Recommendations shown below, pay attention to descriptions in this chapter. Note that the packaging guidelines differ between dangerous goods and non-dangerous goods.

☞ Page 5 EFFECTIVE DATES OF THE UN RECOMMENDATIONS

### 4.1 Necessity of Actions for the UN Recommendations

Use the following flowchart to check if actions for the UN Recommendations are required or not.



\*1 ☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

\*2 When not unpacking an original package shipped by Mitsubishi (hereinafter original package), refer to the following.

☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

If the original package was unpacked, packaging status when the product was packed by the shipper applies.

\*3 When individual packaging boxes shipped by Mitsubishi or a package packed by the shipper is overpacked

\*4 ☞ Page 7 Actions for a Package Subject to the UN Recommendations and Classified as Dangerous Goods (Class 9)

\*5 ☞ Page 8 Actions for a Package Subject to the UN Recommendations and Classified as Non-dangerous Goods

## 4.2 Actions for a Package Subject to the UN Recommendations and Classified as Dangerous Goods (Class 9)

Actions for dangerous goods depend if an original package is unpacked or not.

The following table provides actions for dangerous goods.

Item		When not unpacked	When unpacked*1	
			Lithium batteries only or lithium batteries packed with equipment	Lithium batteries contained in equipment
Packaging specifications		Not required	The specifications must comply with the Packaging Instructions 968 (lithium batteries only) and 970 (lithium batteries packed with equipment) in the 50th Edition of the IATA Dangerous Goods Regulations. (☞ Page 9 Packaging specifications)	The specifications must comply with the Packaging Instruction 969 in the 50th Edition of the IATA Dangerous Goods Regulations. (☞ Page 9 Packaging specifications)
Packaging certification (certification by authority)		Not required	Either approval of a package by authority or UN-approved container is required. (☞ Page 9 Packaging certification)	Depends on a carrier.*2
Warning notice	UN mark	Not required	Description is required. (☞ Page 9 UN mark)	Depends on a carrier.*2
	UN container marking	Description is required. (☞ Page 9 UN container marking)	Description is required. (☞ Page 9 UN container marking)	Depends on a carrier.*2
	Class 9 hazard label	Not required	The label must be affixed. (☞ Page 9 Class 9 hazard label)	The label must be affixed. (☞ Page 9 Class 9 hazard label)
Transport document		The Shipper's Declaration for Dangerous Goods is required for each shipment. (☞ Page 10 Transport document)	The Shipper's Declaration for Dangerous Goods is required for each shipment. (☞ Page 10 Transport document)	The Shipper's Declaration for Dangerous Goods is required for each shipment. (☞ Page 10 Transport document)
Battery safety test		Not required (☞ Page 10 Battery safety test)	Not required (☞ Page 10 Battery safety test)	Not required (☞ Page 10 Battery safety test)

\*1 Packaging status provided in the following page indicates status of original package.

☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

If an original package was unpacked, packaging status when the product was packed by the shipper applies.

\*2 For details, contact the carrier.

### 4.3 Actions for a Package Subject to the UN Recommendations and Classified as Non-dangerous Goods

When a package is classified as non-dangerous goods and lithium batteries are contained in equipment<sup>\*2</sup>, the package needs not comply with the UN Recommendations if the number of lithium batteries (cell) in one package is less than five.

The following table provides actions for non-dangerous.

Item	Lithium batteries only or lithium batteries packed with equipment <sup>*1</sup>	Lithium batteries contained in equipment <sup>*2</sup>	
		More than 4 batteries in one package	4 or less batteries in one package
Packaging specifications	Lithium batteries and equipment must be individually packed in an inner packaging, and they must be packed with strong outer packaging so that the batteries can be protected against external short circuit. When only lithium batteries are packed, the weight of one package must be 2.5kg or less. When lithium batteries are packed with equipment, the maximum number of batteries in each package must be the minimum number required to power the equipment plus two spares. (☞ Page 10 Packaging specifications)	Not required	Not required (except marking with the word "OVERPACK" <sup>*3</sup> ) since this package is not subject to the UN Recommendations.
Packaging certification (self-certification)	A 1.2m drop test must be passed. (☞ Page 10 Packaging certification)	Not required	
Warning notice	Description is required. (☞ Page 11 Warning notice)	Description is required. (☞ Page 11 Warning notice)	
Transport document	A declaration for non-dangerous goods is required for each shipment. (☞ Page 11 Transport document)	A declaration for non-dangerous goods is required for each shipment. (☞ Page 11 Transport document)	
Battery safety test	Not required (☞ Page 11 Battery safety test)	Not required (☞ Page 11 Battery safety test)	

\*1 Packaging status provided in the following page indicates status of original package.

☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

If an original package was unpacked, packaging status when the product was packed by the shipper applies. Therefore, even if the original package corresponds to lithium batteries packed with equipment, the package will be regarded as lithium batteries contained in equipment once it is unpacked, the lithium batteries are mounted to the module, and the module is re-packed.

\*2 Packaging status provided in the following page indicates status of original package.

☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

If an original package was unpacked, packaging status when the product was packed by the shipper applies. Therefore, even if the original package corresponds to lithium batteries contained in equipment, the package will be regarded as lithium batteries packed with equipment once it is unpacked, the lithium batteries are removed from the module and re-packed with the equipment. Note that the number of lithium batteries in one original package is less than five.

\*3 Required when multiple packages that are not subject to the UN Recommendations were packed in one with outer packaging. For details, refer to the following.

☞ Page 11 Overpack



## 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 Packaging Instructions 968, 969, and 970 in the 50th Edition of the IATA Dangerous Goods Regulations.

When only lithium batteries are packed, the weight of one package must be 2.5kg or less for transportation by passenger aircraft and 35kg or less by cargo aircraft.

#### 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 a 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 a 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

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**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 programmable controller products listed in the following page have passed the safety test. No actions need to be taken by a customer.

☞ Page 3 MODELS SUBJECT TO THE UN RECOMMENDATIONS

**5.2 Non-dangerous Goods Regulations**

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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.

When only lithium batteries are packed, the weight of one package must be 2.5kg or less.

When lithium batteries are packed with equipment, the maximum number of batteries in each package must be the minimum number<sup>\*1</sup> required to power the equipment plus two spares.

\*1 Number of batteries packed with equipment or contained in equipment in the original package

**Packaging certification**

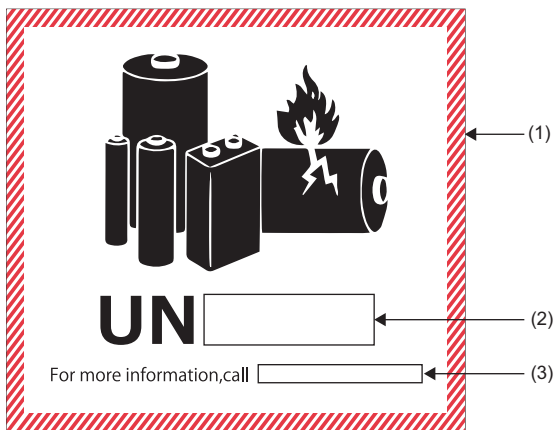
Except lithium batteries contained in equipment, each package must be capable of withstanding a 1.2m drop test in any orientation (self-certification is allowed.) without:

- 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 to the package and the 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 sender'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 programmable controller products listed in the following page have passed the safety test. No actions need to be taken by a 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 11 Warning notice)

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**REVISIONS**

Version	Date of Issue	Revision
-	June 2017	First edition
A	November 2017	Addition of FX3U-32BL
B	August 2018	Available for e-Manual Viewer