

TITLE: Battery products information data sheets of Mitsubishi Electric AC Servo MR-J4 series, MR-JE series, and MR-JET series

1. Outline

This document reports about products information data sheet (PIDS), UN38.3 test summary, and EU battery directive (no-containing of mercury) of Mitsubishi Electric AC Servo MR-J4 series, MR-JE series, and MR-JET series.

2. Batteries to be used

Table 1 shows Mitsubishi Electric's battery model and the lithium battery's supplier/model. Please refer to the attached products information data sheet (PIDS), UN38.3 test summary, and EU battery directive (no-containing of mercury) supplied from the battery supplier.

Table 1 Battery supplier and model

Mitsubishi Electric's battery model	Lithium battery model (Note)	Battery supplier	Number of batteries per unit	Reference
MR-BAT6V1SET	CR17335A	Maxell, Ltd.	2	Products information data sheet : page 2 to 7 UN 38.3 test summary : page 8 EU battery directive (no-containing of mercury) : page 9
MR-BAT6V1SET-A	CR17335A		2	
MR-BAT6V1SET-B	CR17335A		2	
MR-BAT6V1	CR17335A		2	
MR-BAT6V1BJ	CR17335A		2	

Note. The lithium battery model of two CR17335A assembled battery is "2CR17335A".

The lithium battery model of 2CR17335A with a lead wire and a connector connected is "2CR17335A WK17".

The newest products information data sheet (PIDS) is available from the following website of the battery supplier.

<Maxell, Ltd>

URL: http://biz.maxell.com/en/primary_batteries/cr_cylinder.html → "Download"

Products information data sheet (PIDS)/UN38.3 test summary/EU battery directive (no-containing of mercury) as of January 1, 2021 are attached below.

3. Battery transportation

For details of battery transportation by air, refer to Sales and Service No. 14-30E.

FA global website: <http://www.mitsubishielectric.com/fa/>

Click "Technical Bulletin" from the "Download" section, and then click "AC Servos-MELSERVO". Select "SALES AND SERVICE", and click No. 14-30E "Handling of AC Servo Amplifier Batteries for the United Nations Recommendations on the Transport of Dangerous Goods".

In SP188 which indicates conditions for non-dangerous goods during battery transportation by sea, the batteries listed above comply with the provisions of IMDG code 2.9.4.1 and 2.9.4.7 with UN 38.3 test summary, and also comply with the provisions of IMDG code 2.9.4.5.

The provisions of IMDG code 2.9.4.6 are not applicable.



SAFETY DATA SHEET

The batteries are exempt articles and are not subject to the OSHA Hazard Communication Standard Requirement. This sheet is provided as technical information only. The information and recommendations set forth are made in good faith and are believed to be accurate as of the date of preparation. However, **Maxell makes no warranty expressed or implied.**

Section 1 - Product and Company Identification

Product Name Cylindrical Type Lithium Manganese Dioxide Battery (CR)	Sizes: All	Date of preparation: Jan. 1, 2021
Company: Maxell, Ltd., Energy Division	Telephone Numbers: 81-(0)794-63-8054	
Address (Number, Street, City, State, and ZIP Code): 5, Takumidai, Ono-shi, Hyogo 675-1322, Japan	Fax Numbers: 81-(0)794-63-8445	

Section 2 - Hazards Identification

This contains lithium, organic solvent, and other combustible materials. For this reason, improper handling of the battery could lead to distortion, leakage*, overheating, explosion, or fire and cause human injury or equipment trouble. Please strictly observe safety instructions.

(* Leakage is defined as an unintended escape of liquid from a battery.)

Section 3 - Composition/Information on Ingredients

Ingredient	CAS#	Content (wt%)
Manganese Dioxide (MnO ₂)	1313-13-9	30 to 50
Propylene Carbonate (C ₄ H ₆ O ₃)	108-32-7	3 to 10
1,2-Dimethoxyethane (C ₄ H ₁₀ O ₂)	110-71-4	5 to 15
Lithium trifluoro methane sulphonate (LiCF ₃ SO ₃)	33454-82-9	0.1 to 1.5
Lithium or Lithium Alloy (Li)	7439-93-2	2 to 5
Carbon (C)	7782-42-5	0.5 to 3

Lithium content for each cell

Model	Li content (g)	Model	Li content (g)
CR17335 A	0.6	CR17450 A	0.85
CR17335	0.6	CR17450	0.85
-	-	CR17450AH	0.90

Section 4 - First Aid Measures

None unless internal materials exposure. If contents are leaked out, observe following instructions

Inhalation	Fumes can cause respiratory irritation. Remove to fresh air and consult a physician.
Skin	Immediately flush skin with plenty of water. If itch or irritation by chemical burn persists, consult a physician.
Eyes	Immediately flush eye with plenty of water for at least 15 minutes. Consult a physician immediately.
Ingestion	If swallowing a battery, consult a physician immediately. If contents come into mouth, immediately rinse by plenty of water and consult a physician.

Section 5 - Fire Fighting Measures

Extinguishing Media	Extinguisher of alkaline metal fire is effective. Plenty of cold water is also effective to cool the surrounding area and control the spread fire. But hydrogen gas may be evolved by the reaction of water and lithium and it can form an explosive mixture. Therefore in the case that lots of lithium metal batteries are burning in a confined space, use a smothering agent (e.g. carbon dioxide or dry sand).
Fire fighting procedure	Use self-contained breathing apparatus and full protective gear not to inhale harmful gas.

Section 6 - Accidental Release Measures

If the battery releases liquid, wipe it with a dry cloth.

Keep the battery away from fire or heat.

Section 7 - Handling and Storage

1) Handling

● **Never swallow.**

Keep batteries at a place beyond the reach of an infant.

If a battery is accidentally swallowed, see Section 4 - First Aid Measures.

● **Never charge.**

The battery is not designed to be charged by any electrical source. Charging can generate gas

and internal short-circuiting, leading to distortion, leakage, overheating, explosion or fire.

- **Never heat.**

Heating the battery to more than 100 deg. C can increase the internal pressure, causing distortion, leakage, overheating, explosion or fire.

- **Never expose to naked flames.**

Exposing to naked flames can cause the lithium metal to melt, causing the battery to catch fire and explode.

- **Never disassemble or deform.**

Disassembly or deforming the battery can cause leakage, overheating, explosion or fire due to internal short-circuits.

- **Never reverse the positive and negative terminals when inserting in electrical equipment.**

Inserting the battery incorrectly can lead to short-circuiting, charging or forced-discharging. This can cause distortion, leakage, overheating, explosion or fire.

- **Never short-circuit the battery.**

Do not allow the positive and negative terminals to short-circuit. Never carry or store the battery with metal objects such as necklaces or hairpins. Do not take multiple batteries out of the package and stack or mix them when storing. Otherwise, this can lead to distortion, leakage, overheating, explosion or fire.

- **Never weld the terminals or weld wire to the body of the battery.**

The heat of welding or soldering can cause the lithium to melt or cause damage to the insulating material in the battery. This can cause distortion, leakage, overheating, explosion or fire.

- **Never use different batteries together.**

Using different batteries together, i.e. different types or old/used and new or those of different manufacturers, can cause distortion, leakage, overheating, explosion or fire because of the differences in battery properties. Please consult Maxell before designing devices that use two or more batteries connected in a series or parallel, even with the same battery type.

- **Never touch liquid leaking from a battery.**

If the liquid enters the eyes or mouth, see Section 4 - First Aid Measures.

- **Never allow battery liquid to come into contact with a naked flame.**

If leakage or a strong odor is detected, keep the battery away from all naked flames. The leaked liquid is inflammable.

- **Never attach a battery to the skin.**

Attaching a battery to the skin using tape, etc. should be avoided. Moisture from the skin can cause battery discharge, which can produce certain chemical substances that burn the skin.

2) Storage

Never let the battery contact with water. Never store the battery in hot and high humid place.

Section 8 - Exposure Controls, Personal Protection

Respiratory Protection	NA
Ventilation	NA
Eye Protection	NA
Protective Gloves	NA
Other protective clothing	NA

Section 9 - Physical/Chemical Characteristics

Cylindrical shape with primary cell of 3V nominal voltage

Section 10 - Stability and Reactivity

Stability: Stable (Performance deterioration depends on circumstance.)

Incompatibility: Water

Hazardous polymerization: Will not occur.

Condition to avoid: See section 7.

Hazardous Decomposition or Byproducts: Hydrogen (By moisture)

Section 11 - Toxicological Information

As the contents are sealed in the battery case, there is no toxicity.

Section 12 - Ecological Information

If the battery is disposed of on land or in water, the battery case may corrode and liquid leak from the battery. Ecological information has not been reported.

Section 13 - Disposal condition

The battery may be regulated by national or local regulation. Please follow the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with friction tape or some other insulator before disposal.

Section 14 - Transportation Information

- Shipping Name (UN Number): Lithium metal batteries (UN3090)
Lithium metal batteries packed with equipment (UN3091)
Lithium metal batteries contained in equipment (UN3091)
- Hazard Classification: Class 9 (Miscellaneous)

3) Method of transportation: As the cells are manufactured under a quality management program in an ISO9001 certified factory and the cells meet all the requirements of a UN manual of tests and criteria, Part III, sub-section 38.3, the applicable packing instructions (PI) or special provisions (SP) are as per the following table.

The cells or batteries classified in Section II of any Packing Instruction or SP 188 may be exempted from Class 9 Dangerous Goods if complying with all requirements of applicable Section II or SP 188. But lithium metal cells and batteries transported as cargo are restricted to Cargo Aircraft Only.

Note. This does not apply to lithium metal batteries packed with equipment (PI 969) or contained in equipment (PI 970).

Li content per cell	Product name	Air *See Section 15 4)			Sea *See Section 15 5)
		Cell only	Cell packed with equipment	Cell contained in equipment	
not more than 0.3 g	(No)	PI968 Section II	PI969 Section II	PI970 Section II	SP188
more than 0.3 g but not more than 1 g	CR17450 A, CR17450 CR17450AH, CR17335 A, CR17335	PI968 Section IB (8 or less cells: Section II)	PI969 Section II	PI970 Section II	SP188
more than 1 g	(No)	PI968 Section IA	PI969 Section I	PI970 Section I	SP230

As specific districts, countries and airlines may establish their own special requirements, the shipper must confirm requirements with the forwarder in advance.

Please confirm the aggregate lithium content when transport the battery.

Section 15 - Regulatory Information

Major applicable regulations for the transportation of lithium metal cells and batteries are as follows:

- 1) UN(United Nations) Recommendations on the Transport of Dangerous Goods: Model Regulations 21st revised edition
- 2) UN(United Nations) Recommendations on the Transport of Dangerous Goods: Manual of Test and Criteria
- 3) International Civil Aviation Organization (ICAO): Technical Instructions for Safety Transport of Dangerous Goods by Air, 2021-2022 Edition
- 4) International Air Transport Association (IATA): Dangerous Goods Regulations, 62nd Edition
- 5) International Maritime Organization (IMO): International Maritime Dangerous Goods (IMDG) Code, 2020 Edition

Major environmental regulation is as follows:
 EU Battery Directive 2006/66/EC(2013/56/EU)

Section 16 - Other Information

If you want further information, please contact Maxell sales representative.

**LITHIUM CELLS OR BATTERIES TEST SUMMARY AND CERTIFICATION
IN ACCORDANCE WITH SUB-SECTION 38.3
OF MANUAL OF TESTS AND CRITERIA**

BATTERY TRANSPORTION INFORMATION


<p>Name of cell, battery or product manufacture, as applicable:</p> <p>Item Name Model name : 2CR17335A WK17 Internal cell : CR17335A</p> <p>Normal voltage 6V Rated capacity 1650mAh</p> <p>Item Description Lithium-metal battery</p>	<p>Cell, battery or product manufacturer's contact information to include address, phone number, email address and website for more information:</p> <p>Maxell, Ltd. 5 Takumidai, Ono-Shi, Hyogo, 675-1322 Japan Phone: (+81) 794-63-8054 e-mail: takashi-kimura@maxell.co.jp Web: http://www.maxell.co.jp</p>
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<p>Name of the test laboratory to include address, phone number, email address and website for more information</p> <p>Maxell, Ltd. 1 Koizumi, Oyamazaki, Oyamazaki-cho, Otokuni-gun, Kyoto, 618-8525 Japan Phone: (+81) 75-956-4148 email: masahiko-takai@maxell.co.jp Web: http://www.maxell.co.jp</p>	<p>Test report identification number: C-1902-1</p> <p>Date of the test report: February 2, 2019</p>
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<p>Description of cell or battery to include at a minimum: Lithium ion or <u>Lithium metal cell</u> or battery Mass; Watt-hour rating, or <u>Lithium content</u>, Physical description of the cell/battery; and Model Number</p> <p>Cell or battery Type : Battery</p> <p>Lithium content : 1.2g</p> <p>Cell or Battery Weight : 35.7g</p> <p>Physical description : Label and insulated tape</p>	<p>List of test conducted and results(i.e. Pass/Fail)</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Test number</th> <th rowspan="2">Designation</th> <th rowspan="2">Results</th> <th colspan="3">Applicable</th> </tr> <tr> <th>cell</th> <th>Single cell battery</th> <th>battery</th> </tr> </thead> <tbody> <tr> <td>T-1</td> <td>Altitude</td> <td>Pass</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>T-2</td> <td>Thermal cycling</td> <td>Pass</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>T-3</td> <td>Vibration</td> <td>Pass</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>T-4</td> <td>Shock</td> <td>Pass</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>T-5</td> <td>External short circuit</td> <td>Pass</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>T-6</td> <td>Impact / Crush</td> <td>Not applicable</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>T-7</td> <td>Overcharge *</td> <td>Not applicable</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>T-8</td> <td>Forced Discharge</td> <td>Not applicable</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table> <p>* Only secondary battery with protection element</p>	Test number	Designation	Results	Applicable			cell	Single cell battery	battery	T-1	Altitude	Pass	✓		✓	T-2	Thermal cycling	Pass	✓		✓	T-3	Vibration	Pass	✓		✓	T-4	Shock	Pass	✓		✓	T-5	External short circuit	Pass	✓		✓	T-6	Impact / Crush	Not applicable	✓			T-7	Overcharge *	Not applicable		✓	✓	T-8	Forced Discharge	Not applicable	✓		
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<p>Reference to assembled battery testing requirements, if applicable(i.e. 38.3.3 (f) and 38.3.3 (g))</p> <p>Not applicable</p>	<p>Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any:</p> <p>Revision 6, Amendment 1 (2019-)</p>	<p>For air transport only: Does the cell or battery comply with the 30% State of Charge?</p> <p>#N/A</p>
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PRODUCT CLASSIFICATION FOR TRANSPORT(According to UN-DGP)

<p>UN Classification, UN3090</p>	<p>Proper Shipping Name: Lithium Metal Batteries</p>
<p>Signature with name and title of signatory as an indication of the validity information provided.</p> <p style="text-align: center;">Takashi Kimura / General Manager, Design Department</p> <p>Signature </p> <p>Phone: (+81) 794-63-8054 e-mail: takashi-kimura@maxell.co.jp</p>	<p>This document remains valid as long as no changes, modifications or additions are made to the model(s) described in this document, after being transported from a Manufacturer MAXELL, LTD. The model(s) has(have) been classified according to the applicable transport regulations and the UN Manual of Tests and Criteria as of the date of the certification. The model(s) must be packaged, labeled and documented according to country and other international regulations for transportation.</p>
<p>Date document was generated February 10, 2021</p>	



5 Takumidai, Ono-shi, Hyogo 675-1322, Japan
 Phone: 0794-63-8054, Facsimile: 0794-63-8058

Dec. 14, 2018

EU Battery Directive (2006/66/EC)

The summary of Battery Directive is as follows.

Restricted substance	Prohibition the placing on the market	Labeling	
Hg	More than 2 wt% (Button cells)	More than 0.0005%	Crossed-out wheeled bin with chemical symbol "Hg"
Cd	More than 0.002 wt%	More than 0.002 wt%	Crossed-out wheeled bin with chemical symbol "Cd"
Pb	-	More than 0.004 wt%	Crossed-out wheeled bin with chemical symbol "Pb"
Other Batteries			Crossed-out wheeled bin

We certify that the contents of our 2CR17335A WK17 do not have all restricted substances. It is necessary to label on the battery package for retail or on application body installing batteries.

Takashi Kimura

Senior Manager

MD Design Department

Energy Division

Maxell, Ltd