



Silver Oxide Battery

Product Catalogue



For using SII Silver Oxide batteries, please follow the following precautions.

WARNING!

- **Do not heat, disassemble nor dispose of in fire**
Doing so damages the insulation materials and may cause fire, heat generation, leakage or bursting.
- **Do not short.**
If the (+) and (-) come into contact with metal materials, short-circuit occurs. As a result, fire, heat generation, leakage or bursting may occur.
- **Keep batteries out of children's reach.**
It is dangerous that children swallow the battery.
When you design mechanical hardware around the battery, please

fix the battery firmly in order to prevent children from removing it. When you store the batteries, please keep the batteries out of children's reach.

If a battery is swallowed, consult a physician immediately.

- **If leaked liquid, alkaline, get in the eyes, do not rub them, wash them with clean water and consult a physician immediately.**
- **If leaked liquid, alkaline, stick to clothing, for protecting from irritation, wash them with clean water immediately.**

CAUTION!

- **Do not reverse placement of (+) and (-)**
- **Do not solder directly to the battery**
- **Do not use new and used batteries together. Do not use different types of batteries together.**
- **Do not charge.**
- **Do not use nor leave the batteries in direct sunlight nor in high-temperature areas.**
- **Keep batteries away from direct sunlight, high temperature and humidity.**
- **Avoid letting battery contact water.**

- **Make sure to insert batteries without having (+) and (-) come in contact with metal parts of equipment.**
- **Read the equipment instruction manual and precautions carefully before using. Some usage or types of equipment do not suit the specifications or performance of these batteries.**
- **Remove batteries from the equipment, if finished using. Do not leave batteries connecting with equipment after using.**
- **In case of disposal, insulate between (+) and (-) of battery by an insulating material.**

All data, dimensions, characteristics and values shown in this catalogue are for reference only. Please contact your local Seiko Instruments Representative for current detailed specifications.

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SEIZAIKEN



Silver Oxide Batteries have large energy per unit volume that enables them to supply stable voltage for a long period. They have been widely used in quartz watches, which require high quality power source.

Seiko Instruments Inc. (SII) applied precision process technology cultivated by watch manufacturing to its production of silver oxide battery, and started production in 1975.

Silver oxide battery had needed a small amount of mercury in order to prevent performance degradation and leakage. While environmental concern grew as an issue worldwide, SII started the research of mercury-free battery in 1991. In 2005, SII finally succeeded in developing mercury-free silver oxide battery that has equal or better characteristics than the conventional silver oxide battery. The key technologies are SII's unique precise sealing technology, high-corrosion resistance zinc alloy, and addition of a high performance inhibitor in the electrolyte.

FEATURES

- **Excellent discharge characteristics**

Operating voltage is very stable until the end of discharge.

- **Excellent leakage resistance**

Excellent leakage resistance is achieved by our newly developed crimping structure and by our new high-performance manufacturing machinery.

- **High quality**

SEIZAIKEN batteries are manufactured in a high-tech clean room environment in a newly constructed factory.

This facility was specially designed for the manufacturing of ultra precision electronic devices and incorporates all new equipment.

Within the clean room environment, SII has eliminated contamination allowing us to ensure consistent quality.

- **Made In Japan**

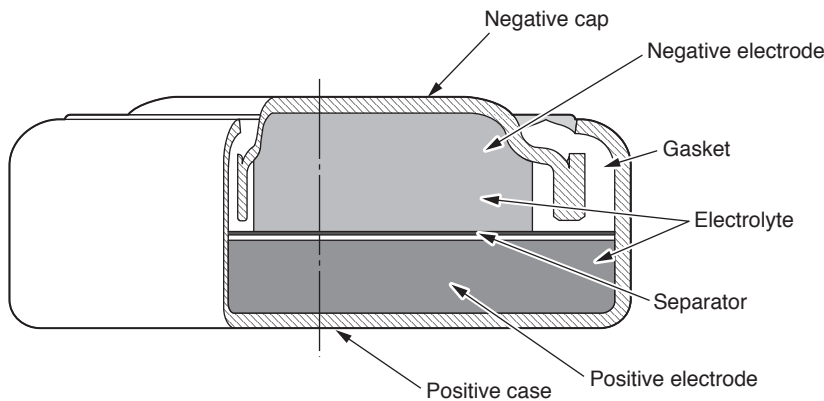
All the processes, such as parts selection, production, inspection, are done in Japan.

SEIZAIKEN battery, made by a watch maker, is well suitable to watch application.

APPLICATIONS

- Watch
- Calculator
- Digital Thermometer
- Information Devices
- Personal Healthcare Devices
- Electric Games

STRUCTURE



CHEMICAL REACTIONS

Positive electrode : Silver oxide

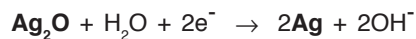
Negative electrode : Zinc

Electrolyte : Alkaline aqueous solution

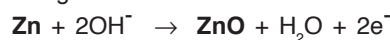
Sodium hydroxide (NaOH)Low Drain Battery

Potassium hydroxide (KOH).....High Drain Battery

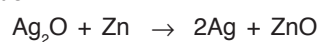
Reaction in Positive side:



Reaction in Negative side:



Total reaction:



• Low Drain Battery

Model		Characteristics (RT)			Dimensions		Weight (g)	C.C.V. ^{2*}	
JIS code	IEC code	Nominal Voltage (V)	Standard Capacity ^{1*} (mAh)	Standard Discharge Current (μ A)	Diameter (mm)	Height (mm)		at 24°C (V)	at -10°C (V)
SR416SW	337	1.55	7.5	10	4.8	1.65	0.11	1.35	1.10
SR421SW	348	1.55	12	20	4.8	2.15	0.14	1.35	1.10
SR512SW	335	1.55	5.5	5	5.8	1.25	0.15	1.45	1.10
SR516SW	317	1.55	12.5	20	5.8	1.65	0.18	1.45	1.10
SR521SW	379	1.55	13 16	20 30	5.8	2.15	0.23	1.45	1.10
SR527SW	319	1.55	22	40	5.8	2.70	0.29	1.45	1.10
SR616SW	321	1.55	16	20	6.8	1.65	0.25	1.45	1.10
SR621SW	364	1.55	21 23	30 40	6.8	2.15	0.32	1.45	1.20
SR626SW	377	1.55	24 28 30	30 40 40	6.8	2.60	0.39	1.45	1.20
SR712SW	346	1.55	10	10	7.9	1.25	0.26	1.45	1.20
SR716SW	315	1.55	21	30	7.9	1.65	0.33	1.45	1.20
SR721SW	362	1.55	23 28	40 40	7.9	2.10	0.42	1.45	1.20
SR726SW	397	1.55	34	40	7.9	2.60	0.52	1.45	1.20
SR731SW	329	1.55	36	50	7.9	3.10	0.56	1.45	1.20
SR41SW	384	1.55	45	50	7.9	3.60	0.67	1.45	1.20
SR912SW	-	1.55	15	20	9.5	1.25	0.40	1.45	1.20
SR916SW	373	1.55	27	50	9.5	1.65	0.51	1.45	1.20
SR920SW	371	1.55	46 35	60 50	9.5	2.05	0.60	1.45	1.20
SR927SW	395	1.55	53 60	80 100	9.5	2.70	0.75	1.45	1.20
SR936SW	394	1.55	85	140	9.5	3.60	1.10	1.45	1.20
SR1120SW	381	1.55	53	80	11.6	2.05	0.93	1.45	1.20
SR1130SW	390	1.55	80	100	11.6	3.05	1.29	1.45	1.20
SR43SW	301	1.55	120	150	11.6	4.20	1.75	1.45	1.20
SR44SW	303	1.55	160	180	11.6	5.40	2.20	1.45	1.20

^{1*} The standard capacity is calculated by the measurement result of discharging time with the standard discharge current to the voltage 1.2V.

^{2*} C.C.V.: Closed Circuit Voltage / Low Drain 2k Ω 7.8msec Pulse

• High Drain Battery

Model		Characteristics (RT)			Dimensions		Weight (g)	C.C.V. ^{3*}	
JIS code	IEC code	Nominal Voltage (V)	Standard Capacity ^{1*} (mAh)	Standard Discharge Current (μ A)	Diameter (mm)	Height (mm)		at 24°C (V)	at -10°C (V)
SR626W	376	1.55	28	50	6.8	2.60	0.39	1.35	0.95
SR721W	361	1.55	26	50	7.9	2.10	0.41	1.35	1.05
SR726W	396	1.55	34	50	7.9	2.60	0.52	1.35	1.05
SR41W	392	1.55	45	80	7.9	3.60	0.67	1.35	1.05
SR920W	370	1.55	42	80	9.5	2.05	0.60	1.40	1.00
SR927W	399	1.55	53 60	90 110	9.5	2.70	0.75	1.40	1.05
SR1120W	391	1.55	53	90	11.6	2.05	0.93	1.40	1.20
SR1130W	389	1.55	80	130	11.6	3.05	1.29	1.40	1.20
SR43W	386	1.55	120	220	11.6	4.20	1.75	1.40	1.20
SR44W	357	1.55	160	250	11.6	5.40	2.20	1.40	1.20

^{1*} The standard capacity is calculated by the measurement result of discharging time with the standard discharge current to the voltage 1.2V.

^{3*} C.C.V.: Closed Circuit Voltage / High Drain 200 Ω 5sec DC

For applications besides watch

SEIZAIKEN Batteries are useful for not only watches but also any applications.
Please let us know your specification-request.

Fax Sheet

Micro-Energy Division Sales Sec. +81-43-211-8034 Battery Sales Person

Application:
Estimated life span:
Requested discharge capacity:
Requested voltage:
Consumption current:
Cut-off voltage:
Temperature, humidity:

Your contact information

Name:
Section:
Company name:
email address:
Phone number:
Fax number:

TS Lithium Rechargeable Battery <For Solar Watches> 1.5V Type

TS920E / TS621E (Under Development)

We have 1.5V type Lithium rechargeable batteries for solar watches.
Please contact us.

SPECIFICATIONS

Type	Nominal Voltage (V)	Charge Voltage ^{*3} (V)	Nominal Capacity (Voltage Range V) (mAh)	Internal Impedance ^{*1} (Ω)	Standard Charge/Discharge Current (mA)	Cycle Life ^{*2} (Time)	Diameter (mm)	Height (mm)	Weight (g)
TS920E	1.5	1.6 to 3.0	5.5 (2.3 to 1.0)	20	0.05	1000 (20% D.O.D.) 100 (100% D.O.D.) ^{*4}	9.5	2.0	0.46
TS621E (Under development)	1.5	1.6 to 3.0	2.5 (2.3 to 1.0)				6.8	2.1	

*1. Value measured using an AC (Alternating Current) method in the fully charged state.

*2. Counts of charge and discharge repetition that maintains about 50% of the minimum guaranteed capacity

*3. A constant voltage charge is recommended, but due to a limit in the charge current, it is necessary to insert a resistor to regulate the charge current.

Please contact us for further details.

If a constant current charge is required, please contact us for more information.

*4. D.O.D. : Depth of Discharge

TS Lithium Rechargeable Batteries are not reflowable. Please mount them on PCB by hand soldering.

Environmental Activities at Micro-Energy Division

Environment & Quality Policy

Seiko Instruments Inc., Micro-Energy Division is located in Ayashi, a city with beautiful nature, in Miyagi Prefecture. Our aim is to provide customer satisfaction and harmony with the environment through all our products, from Micro battery to other electronic products, and sales activities.

1. We adhere firmly to laws, regulations and customers' specified requirements.
2. We aim to prevent pollution, to reduce CO₂, and to conserve biodiversity.
3. We set goals, take actions, conduct regular reviews, and improve the system and performance continuously.
4. We contribute to the society by supporting green procurement, developing green products, and promoting green life activity.
5. We adhere to regulations and recommendations regarding Chemical substance content in our products and will promote reduction and replacement.
6. We vigorously educate ourselves and try to engage voluntarily in green life activity.

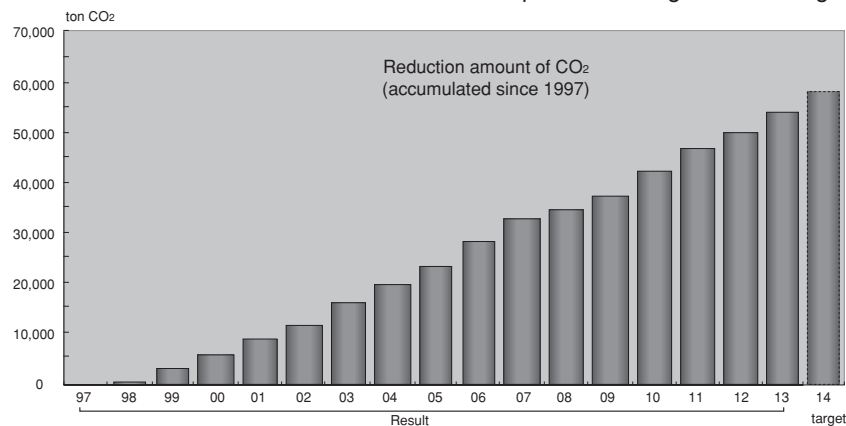
Based on the above policy, the following six environmental approaches are now being implemented throughout Micro-Energy Division.

1. Enrich the line up of Eco-Products

- We introduced the SII Green Product Label System which is equivalent to the ISO 14021 Type II environmental label. At the end of FY2006, 100% of our products are certified as SII Green Products. In addition, 38 products are certified as SII "High Grade" Green Products.

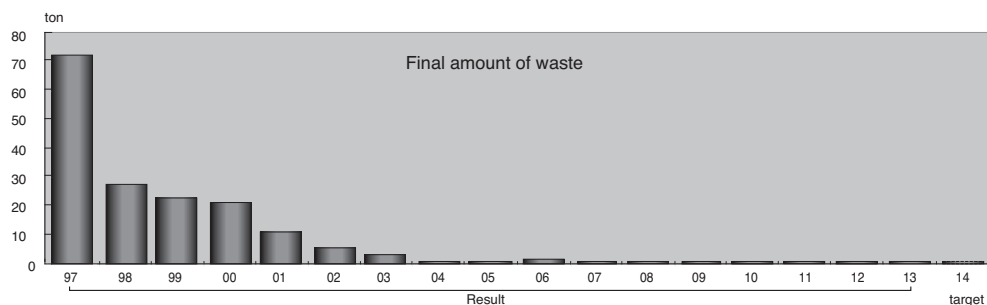
2. Reduction of Greenhouse Gas

- We practice various CO₂ reduction measures like using Eco-machinery. Since 1997, we have successfully reduced a total of 54,100 tons of CO₂. We believe our efforts contribute to the prevention of global warming.



3. 3R Promotion Activity

- We have promoted the "reduce and reuse" activities and also promoted recycling at the end of the production process. With these activities, we achieved "Zero-emission" in 2004. We have reduced the non-recyclable wastes to less than 1 ton - less than 1% of our 1997 results.



4. Biodiversity Conservation

- We endeavor to deepen our understanding on the relevancy between biodiversity and our business activities, and to contribute to the conservation of biodiversity by participating local community activities.

5. Green Purchasing

- We adhere to a green purchasing campaign through the purchase of ingredients, manufacturing materials, and other necessary products, whenever appropriate.

6. Green Life

- With the participation of all of Micro-Energy Division members, we deploy a clean-up and beautification campaign in all areas surrounding our factory once a year. In addition, we participate in the clean up activity at Hirose River once a year.

7. Conflict Minerals

- Recognizing the international importance of conflict minerals issue, we prohibit the use of such minerals.



Micro-Energy Division who manufactures the products described in this catalog holds the ISO 9001 quality management system certificate, and the ISO 14001 environmental management systems certificate.



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(Specifications are subject to change without notice.)

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