CHICKEN SWITCH®

A Portable Actuator for Remotely Operating Square D P-Frame Circuit Breakers

P11 Model

User's Manual

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User's Manual

for the P11 model

1.0 Arc-blast Hazards

The hazards associated with electrical arc-blasts are well documented. Studies conducted by numerous industries and professional organizations have sought to quantify the intensity of arc-blast, the risks to personnel, and various methodologies for mitigating the risks.

Without doubt, increasing the distance between the arc and a human is the single greatest favorable factor in reducing injuries.

The Chicken Switch® is not a panacea but rather one more tool available for protecting workers while they are performing electrical switching.

Using a Chicken Switch® may not negate the need for additional personal protective measures. The user is ultimately responsible for evaluating each situation to determine if additional protective measures are needed.

WARNING

Electrical switching may present risk of serious injury or death. This device should only be used by qualified persons after careful analysis of the hazards.

2.0 Safety Information

ALWAYS connect the control cable to the actuator BEFORE installing the Chicken Switch®.

2.1 Finger pinch points

NEVER place hands, fingers, or other body parts in the area of the moving arm. This includes the left side and the top of the frame where the arm moves towards.

Keep fingers away from the gears on the underside of the actuator.

Keep fingers clear of the bottom of the actuator when the actuator is near a ferrous surface where the magnets could pinch your fingers.

2.2 Strong magnets

The holding magnets are very strong. Keep magnetically-sensitive objects such as watches or computer disks away from the bottom of the actuator.

3.0 Battery Requirements

- Sixteen (16) AA cells are required – eight cells in each battery holder. Carefully observe polarity when installing cells.

- **It is highly recommended to use ENERGIZER L91 ULTIMATE LITHIUM batteries** (these are NOT the lithium ***ion*** rechargeable battery type). See Section 7.1 for the L91 datasheet. These batteries are long lasting and will provide the high energy required to operate the P-11 actuator.

- New Alkaline batteries can be used in an emergency but the life expectancy will be short.

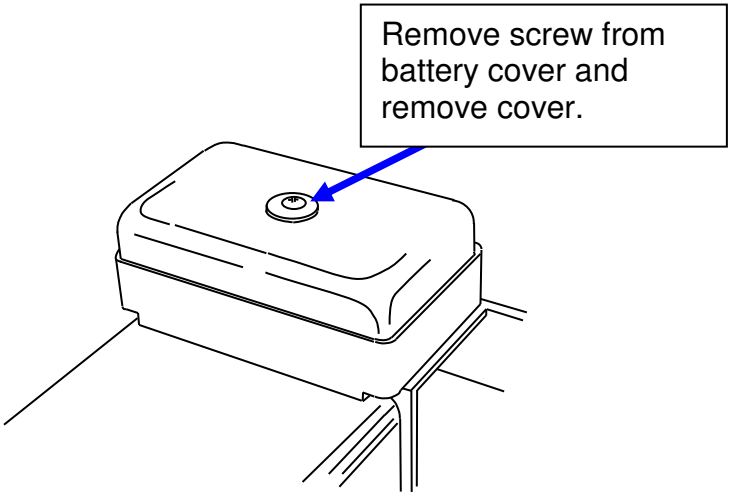
3.1 Battery Life

- A set of Energizer Ultimate Lithium cells will allow for many operations of the actuator. The life expectancy from alkaline batteries will be very limited.

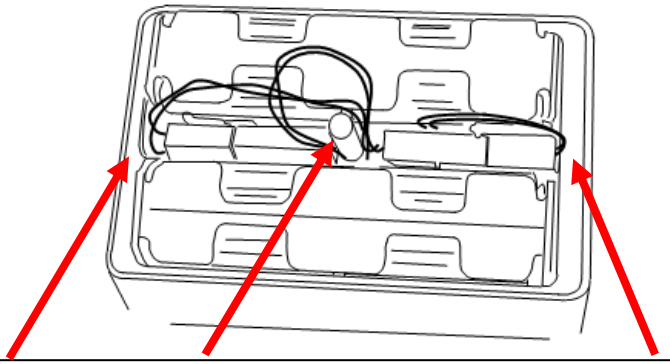
3.2 Battery Replacement

- ALWAYS turn OFF the power switch before replacing batteries to avoid possible static damage of the electronics!

- Remove the screw from the top of the silver cover on top the actuator to access the batteries. Be careful when reinstalling cover not to pinch battery wires.



Battery box with cover removed.

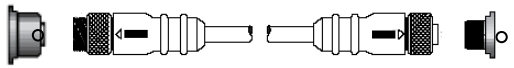


CAUTION - BE CAREFUL that wires do not get pinched on the edge of the cover or on the center post.

4.0 Operation

ALWAYS connect the control cable to the actuator BEFORE installing the Chicken Switch®.

4.1 Connecting the control cable:



1. Align the arrow on the cable end with the top of the receptacle.
2. Push in and engage the threads on the coupling nut and turn clockwise.
3. After one or two turns of the coupling nut, push in on the cable end. Repeat this until the connector is fully seated.
4. Use a similar technique of turn-stop-and-pull to disengage the cable ends.

4.2 Sequence of Operation:

1. Connect the control cable to the actuator.

2. Connect the control cable to the hand-held controller.

3. Before installing the actuator, the actuator arm must be positioned to correspond to the current breaker position – either the Close or Trip position. (See note 1 on next page if your breaker has automatically tripped due to a fault)

4. Lay the actuator on a flat surface, turn the power on, and while keeping your hands and fingers away from the actuator, command the actuator to move to the current breaker position.

5. Turn OFF the power to the actuator.

6. Install the actuator by following the steps in Section 4.3.

7. Ensure you are at a safe distance from the circuit breaker that is to be operated.

8. While holding the Enable button, twist and HOLD the control switch in the desired direction of breaker movement. You must hold the control switch and the Enable button until the breaker reaches the necessary stroke to close or trip the breaker. (See Section 4.4 for hand-held controller information)

9. Once the breaker trips or closes, release the control switch and Enable button on the hand-held controller. (also see note 2)

10. Turn the actuator power OFF before attempting to remove actuator from breaker.

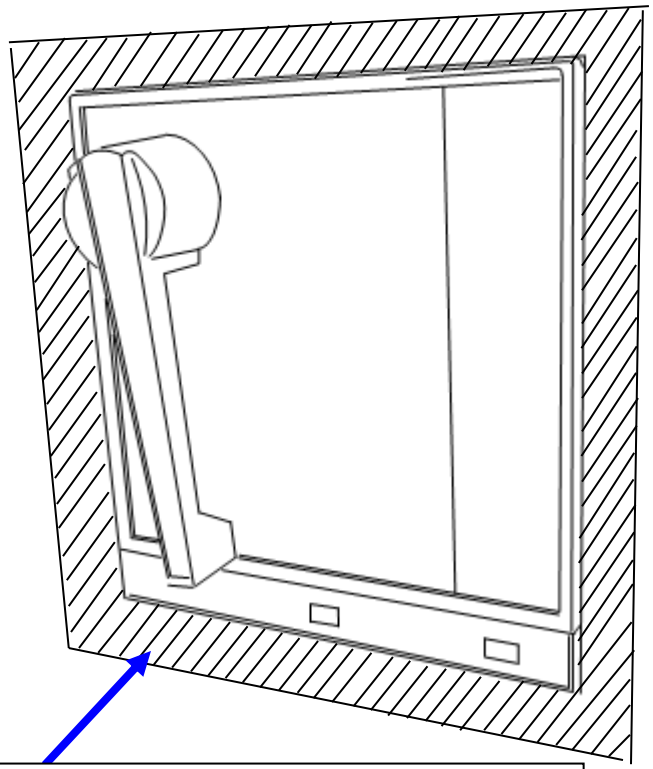
Notes

1. The P-11 Actuator will not reset the breaker if it has tripped due to a fault. The breaker must be manually reset prior to installing the actuator.

2. If the breaker is closed into a fault, the breaker will trip but the P-11 actuator will continue to hold the breaker handle in the closed position. If this happens, remove the actuator to allow the breaker handle to return to its tripped position.

4.3 Attaching and Removing the Actuator:

This is an illustration of the P-Frame breaker prior to the installation of the actuator. It is shown in the Trip position. If your breaker is in the Closed position, the handle will be horizontal instead of vertical.

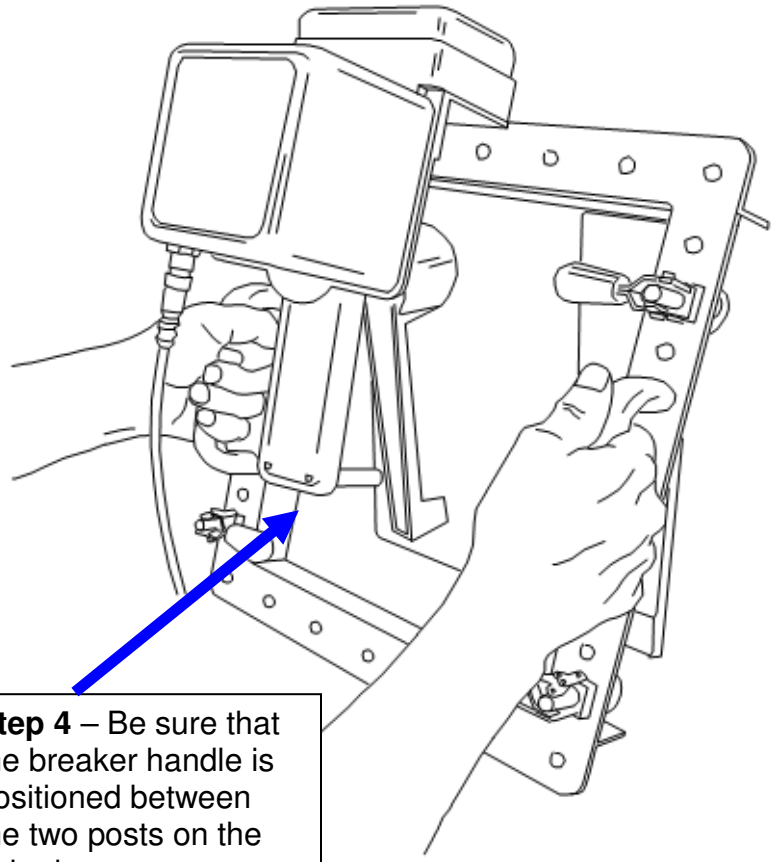


Note that the switchgear doors must be free of labels or obstructions in the area approximately 2" around the perimeter of the breaker as shown by the hashed area in this illustration.

Step 1 – Rotate Red magnet levers so that magnets are retracted.

Step 2 – Align frame opening with perimeter of the breaker.

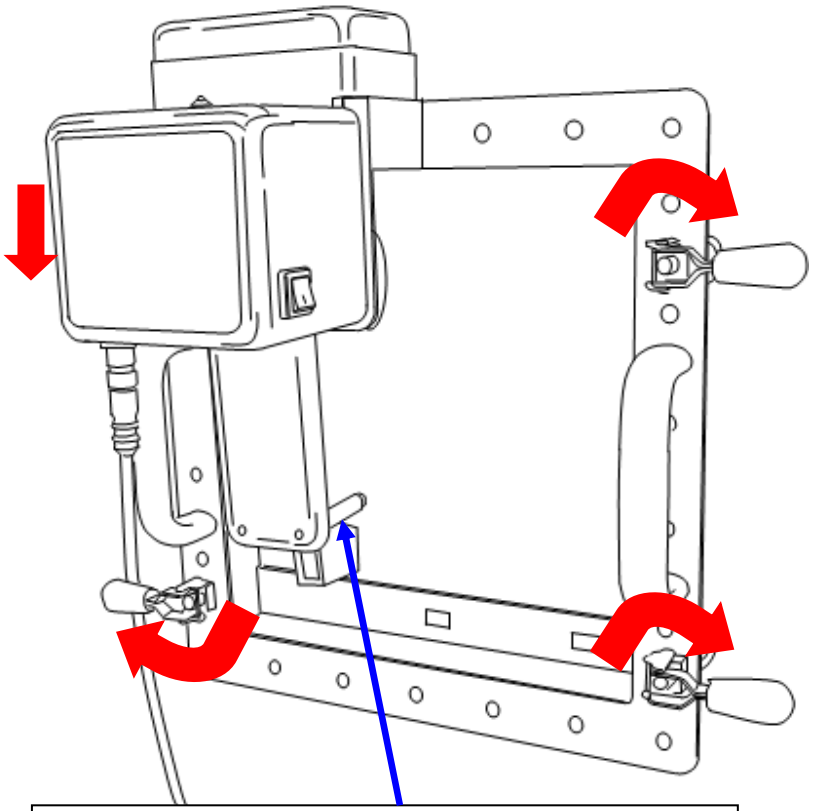
Step 3 – Align frame opening with breaker perimeter.



Step 4 – Be sure that the breaker handle is positioned between the two posts on the actuator arm.

Step 5 – Press actuator firmly against the switchgear.

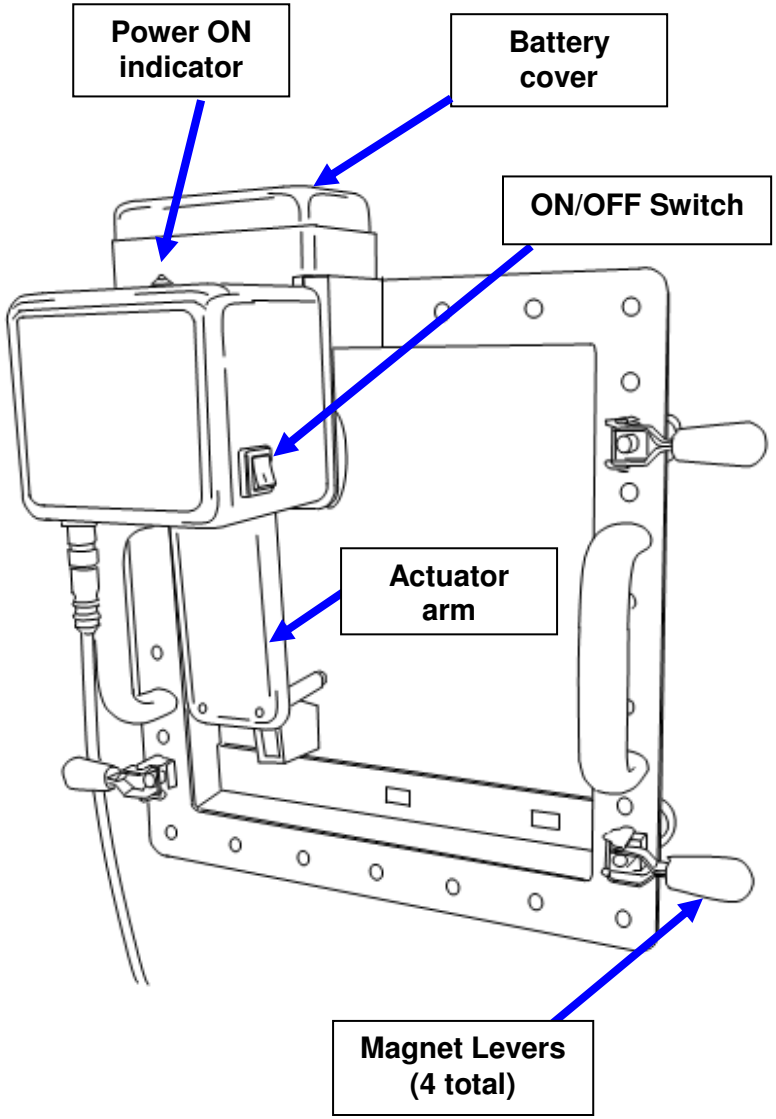
Step 6 – Rotate all four RED magnet levers to engage magnets to switchgear.



Note that actuator arm pins must be straddling the breaker arm. In this illustration, the breaker arm is in the trip position. Should the breaker already be in the Closed position, the actuator arm will have to be positioned in the Close position prior to installing it. See Section 4.2, Steps 3 and 4.

Step 7 – To remove the actuator - while firmly holding the actuator, release the magnets with magnet levers, and carefully pull the actuator away from the switchgear.

4.4 Actuator components



4.5 Hand-held controller indicator lights & controls (see picture on next page)

NOTE: the indicator lights only work when the ENABLE button is depressed.

GREEN: indicates the actuator is being commanded to rotate in the TRIP direction.

RED: indicates the actuator is being commanded to rotate in the CLOSE direction.

YELLOW: indicates the actuator the microprocessor is functioning and the batteries are healthy.

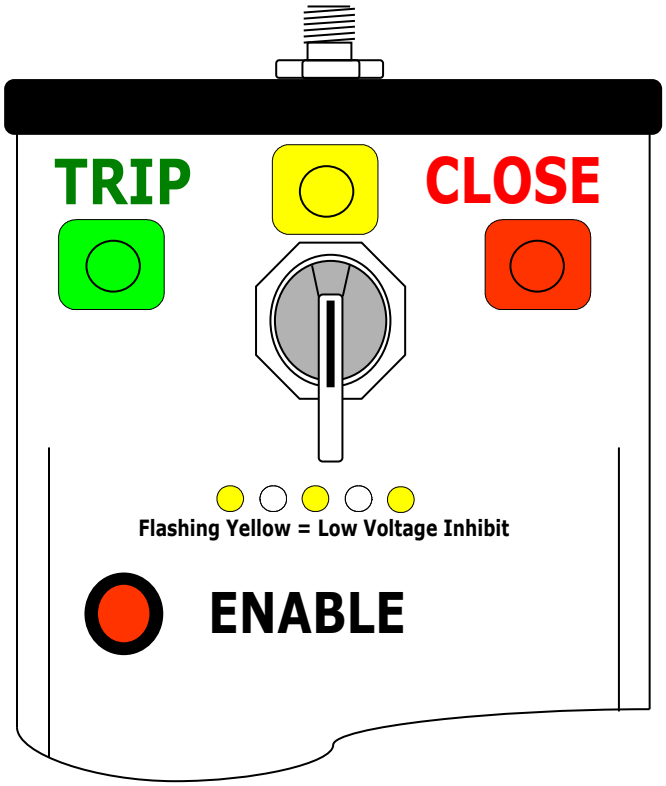
Rapidly blinking YELLOW indicates the battery voltage with zero load has fallen to an unacceptable level. Operation is inhibited until batteries with an acceptable voltage level are installed. See Section 3.0 for battery specifications.

The ENABLE button:

The Enable button must be continuously depressed in order to command the actuator.

Releasing the enable button has the same affect as returning the selector switch to neutral – the actuator will stop moving.

Note:
If the control switch is held in the trip or close position for longer than approximately 8 seconds the drive motor will de-energize and the arm will stop. Release the Enable button to reset this timeout function.



5.0 Care and Storage

5.1 Cleaning the magnets

Over a period of time, the magnets may attract ferrous debris. Exercise care to avoid setting the actuator where the magnets might attract debris. If this does occur, a piece of tape to clean the face of the magnets. Keeping the magnet faces clean ensures that maximum holding power is maintained.

5.2 Storage

Never store the batteries where the ambient temperature might exceed 110º F.

Avoid getting the unit wet or storing it in a high humidity location.

6.0 Warranty

MarTek Ltd. guarantees all products manufactured by MarTek Ltd. only against defects in materials and/or workmanship for a period of twelve (12) months commencing on the date the product is received by the customer. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MarTek Ltd. will, at its option and its cost (excluding shipping expenses), repair, replace or refund the purchase price of any product manufactured by MarTek Ltd. which has a defect in materials and/or workmanship. THIS IS CUSTOMER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY. IN NO EVENT WILL MARTEK LTD'S LIABILITY FOR DAMAGES (WHETHER ARISING FROM BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE) EXCEED THE PURCHASE PRICE OF THE PRODUCT CONCERNED NOR WILL MARTEK LTD. BE LIABLE FOR PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS) EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

MarTek Ltd. reserves the right to disallow warranty repairs if the unit has been disassembled or misused, as determined by MarTek Ltd. in good faith. Please contact us at (800)-248-4958 for a return authorization.

MarTek Ltd.
4782 Chimney Drive
Charleston, WV 25302
1-304-965-9220
1-800-248-4958

7.0 Specifications

MECHANICAL

Holding magnets:	Four magnets, each rated @ 55.1 lbs force, 12,600 Gauss.
Gearmotor:	All metal gears, in a formed metallic housing. DC brushed, permanent magnet motor.
Torque:	Approximately 30 ft-lbs
Typical operating speed:	Approximately 2 seconds from trip to close position although time can vary depending on the load on the actuator.

ELECTRICAL

Operating voltage:	24 volts DC
Fuse:	Internal, non-replaceable
Power supply:	16 AA Lithium disposable batteries.
Control Cable:	30 feet in length (9.1 meters), 5-conductor, extra-flexible, PUR insulation
Controller:	Requires two-hand operation. The 'enable' button must be depressed while rotating the controller selector switch. A programmable micro-controller manages control inputs, motor functions, monitors and limits mechanical travel and performs timing functions to protect the motor in a stalled condition. An intelligent 'H-bridge' motor driver provides start/stop/braking motor functions. The H-bridge has integral thermal shutdown protection.

7.1 Battery Specifications

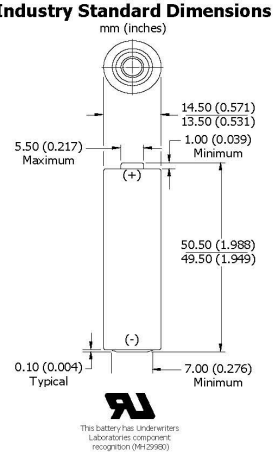
PRODUCT DATASHEET

Energizer

1-800-383-7323 US/CAN
www.energizer.com

ENERGIZER L91
Ultimate Lithium

Industry Standard Dimensions

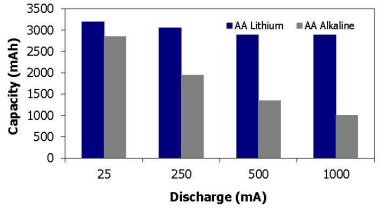


Specifications

AA

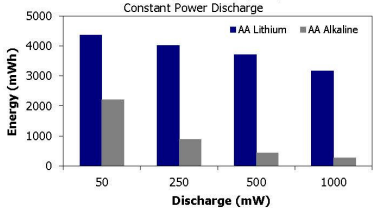
Classification:	"Cylindrical Lithium"
Chemical System:	Lithium/Iron Disulfide (Li/FeS_2)
Designation:	ANSI 15-LF, IEC-FR6
Nominal Voltage:	1.5 Volts
Storage Temp:	-40°C to 60°C (-40°F to 140°F)
Operating Temp:	-40°C to 60°C (-40°F to 140°F)
Typical Weight:	14.5 grams (0.5 oz.)
Typical Volume:	8.0 cubic centimeters (0.5 cubic inch)
Max Discharge: (single battery only)	3.0 Amps Continuous 5.0 Amps Pulse (2 sec on / 8 sec off)
Max Rev Current:	2 uA
Typical Li Content:	Less than 1 gram
Typical IR:	90 to 160 milliohms (depending on method)
Shelf Life:	15 years at 21°C
Shipping:	Please refer to PSDS Document

Milliamp-Hours Capacity
Constant Current Discharge to 0.9 Volts at 21°C

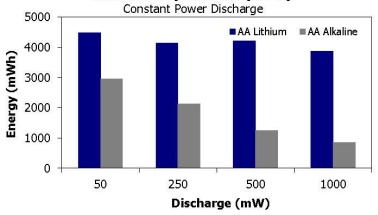


Milliwatt-Hours Capacity at Cold/Room Temperature
Constant Power Discharge to 1.0 Volts at 0°C and 21°C

Cold Temperature (0°C)
Constant Power Discharge



Room Temperature (21°C)
Constant Power Discharge



PRODUCT DATASHEET

Energizer

1-800-383-7323 US/CAN
www.energizer.com

ENERGIZER L91

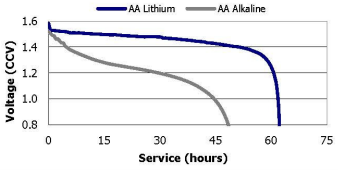
AA

Typical Discharge Curve Characteristics

Constant Current Discharge at 21°C (low and high drains)

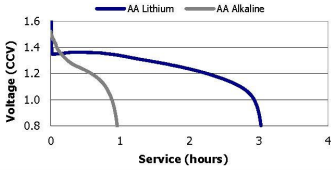
Low Drain Performance

50mA Continuous (21°C)



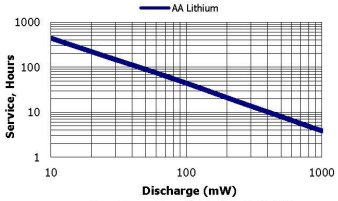
High Drain Performance

1000mA Continuous (21°C)



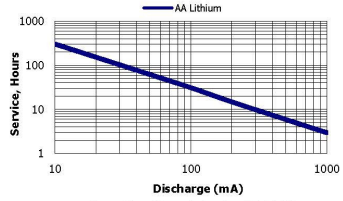
Constant Power Performance

Typical Characteristics to 1.0 Volts (21°C)

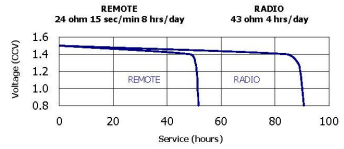


Constant Current Performance

Typical Characteristics to 1.0 Volts (21°C)



Application Tests (21°C)



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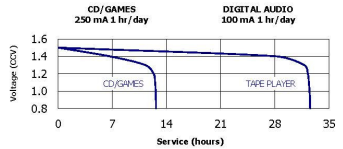
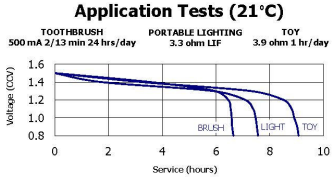
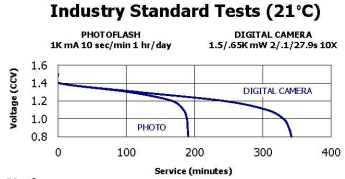


Application Tests (21°C)



Industry Standard Tests (21°C)



Important Notice

This datasheet contains typical information specific to products manufactured at the time of its publication.

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