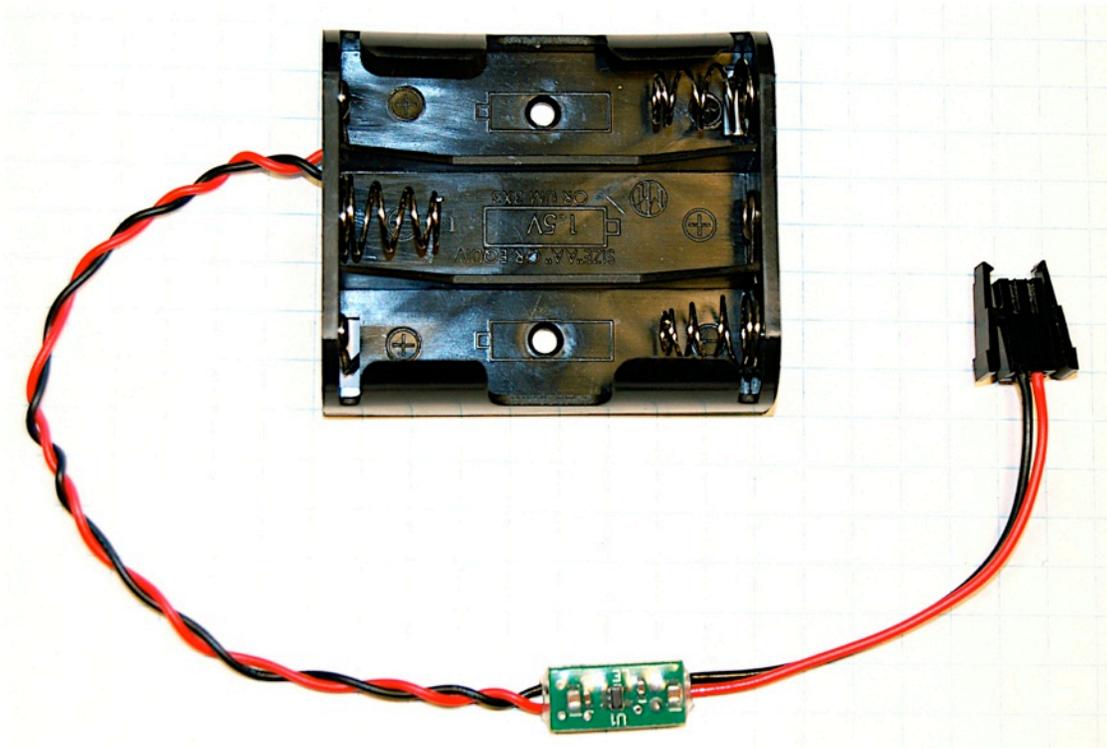


MODEL: BBR-3.6V-101
DATASHEET / INSTALLATION MANUAL



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Author: P. Kurucz



Foreword

A) Limited Warranty

Laup Engineering guarantees that this product is free from manufacturing defects for the period of one (1) full year from the date of purchase. We will repair or replace the item at our discretion. This warranty is void if the product has been altered or damaged. Please contact us at: support@cncbatteries.com if you are experiencing any issues.

B) 30-Day Money Back Guarantee

If, within 30 days of receiving this product you are not satisfied with it, you may return it for a full refund. You will receive a refund for the full purchase price, minus any shipping and handling expenses. This guarantee is void if the product has been altered or damaged. Please contact us at: support@cncbatteries.com to arrange the return and to receive an RMA number.

C) Installation Safety

Please use common sense when installing this device and when working on the NC/CNC machine. There are lethal voltages in the CNC control box. And there is the very real possibility that the machine may move in an unpredictable manner if care isn't exercised while installing and/or performing maintenance this device. It is the sole responsibility of the installer to make sure that the device is installed safe and proper manner, in compliance with all national and local electrical codes and safety requirements. All machine safeguards and safety interlocks must be fully operational at all times. Laup Engineering is not responsible for any property damage, injury or loss of life that occurs as a direct or indirect result of installing, using or performing maintenance on this product.

D) Disclaimer of Liability

Laup Engineering does NOT assume any liability arising out of the application or use of this product, and specifically disclaims any and all liability, including without limitation consequential or incidental damages even if Laup Engineering has been advised of the possibility of such damages.

E) Copyrights and Trademarks

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General Description

The BBR-3.6V-101 is designed to replace a 3.6V Lithium Thionyl Chloride (Li/SOCI₂) backup battery commonly used in Mitsubishi servo drives, PLCs and CNC controls. These Mitsubishi devices are often installed in CNC equipment such as Mazak Milling and Turning centers.

The BBR-3.6V-101 operates on standard AA sized Alkaline batteries. A set of 3 AA batteries are estimated to be able to provide backup power to a Mitsubishi MR-J2 servo drive for 2 years with the drive left un-powered. The same set of AA batteries should be able to provide backup power for an even longer period of time if the drive is operated regularly since the batteries are only discharged when the drive isn't being powered from the AC mains.

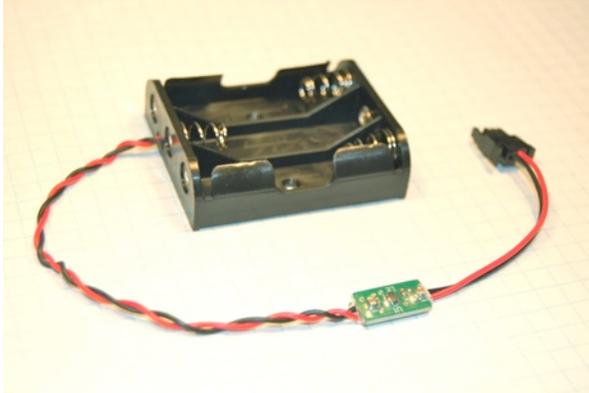
Features

- Operates on readily available standard Alkaline AA batteries (ANSI-15A, IEC-LR6).
- Longer time interval between battery replacement. Energizer E91 AA cells (included with this device) are rated for 2800 mAh whereas the stock Lithium Thionyl Chloride is rated at 1600 mAh.
- Plug-and-play - Uses the same connector as the Mitsubishi MR-J2 servo drive and other popular Mitsubishi PLCs and CNC controls.
- Compatible with the low battery alarm in the MR-J2 servo drive.
- Reverse leakage protection to prevent charging circuits from damaging the batteries.

Battery Compatibility Note

Although the BBR-3.6V-101 is *technically* compatible with many of the various 1.5 volt AA battery chemistries available today; many of the newer chemistries are designed to be used in electronics that draw a large amounts of current from the batteries such as digital cameras and high power flashlights. Consequently these chemistries have a much higher rate of internal self discharge than compared to standard Alkaline batteries. An easy way to determine if the internal self discharge rate is acceptable is to look at the manufacturer's specification for the shelf/storage life of the battery in question. **You should only use batteries that have shelf life greater than 8 years.** If you are unsure about a specific battery being suitable for use in this product, please **ONLY use long life Alkaline AA batteries** to maximize the amount of battery backup time available.

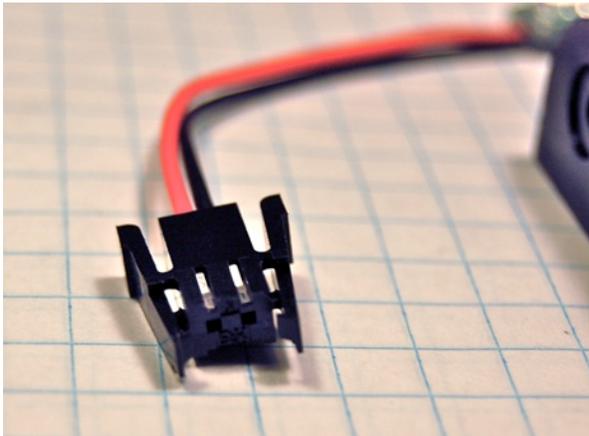
Whats in the box



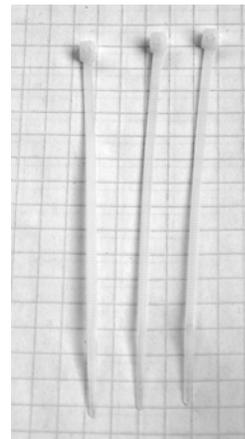
Battery Backup Unit



A fresh set of AA batteries



Close-up of the connector



Zip ties for mounting

Compatibility List

The BBR-3.6V-101 is designed to replace the Mitsubishi ER17330V/3.6V battery and connector assembly pictured below.



Mitsubishi ER17330V Battery

The ER17330V assembly is also known by the following names:

- A6BAT
- MRBAT
- MR-BAT
- B9670MC
- A6BAT-MRBAT

The ER17330V battery assembly is used on the following Mitsubishi series products:

A	A1FXCPU	A1S	A2S	AnS	MR-J2
MR-J2A	MR-J2S	Q	RH-5AH	RH-10AH	RH-15AH
RP-1AH	RP-3AH	RP-5AH	RV-1A	RV-2AJ	RV-3AL
RV-4A	RV-5AJ	RV-6S	RV-12S		

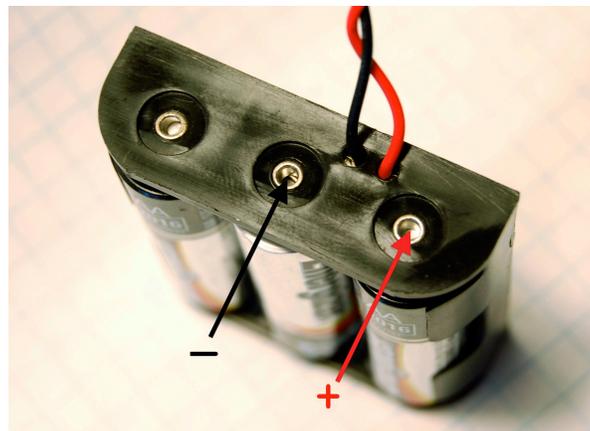
The ER17330V battery assembly is also used on the Hitachi H series PLCs.

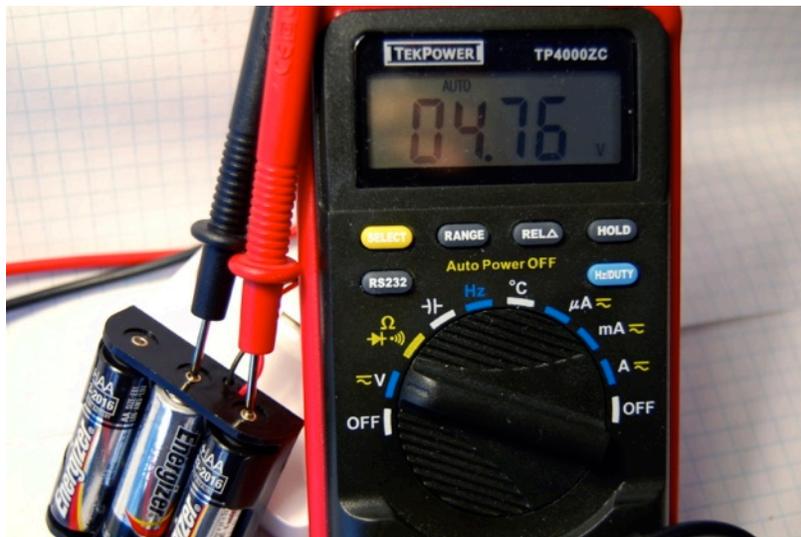
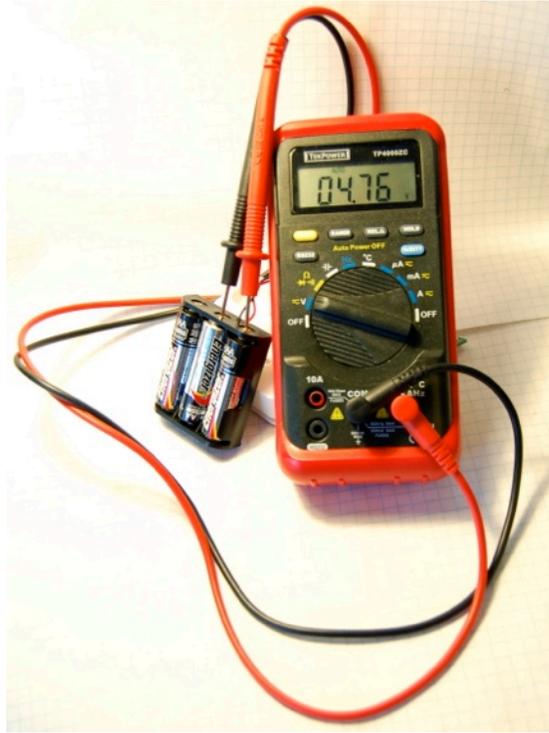
Checking and replacing the Alkaline batteries

It is quite easy to check the battery pack voltage to determine when the cells are depleted and need to be replaced. The table below lists the battery pack voltage and the corresponding output voltage supplied by the BBR-3.6V-101 to the device. The battery pack voltage for a fresh/new set AA cells is approximately 4.8 Volts. You should replace the AAs with fresh cells once the battery pack voltage is at or below 3.2 Volts. Once the pack voltage reaches 3.0 Volts the battery cells only have approximately 10% of their capacity left, but at this point the output voltage from the BBR-3.6V-101 may not be high enough to properly keep the NC/servo drive properly backed up.

BATTERY PACK VOLTAGE (V)	OUTPUT VOLTAGE (V)
5.20	3.62
5.00	3.62
4.80	3.62
4.60	3.62
4.40	3.62
4.20	3.62
4.00	3.62
3.80	3.62
3.60	3.56
3.40	3.38
3.20	3.19
3.00	2.99
2.80	2.79
2.60	2.59
2.40	2.39
2.20	2.19
2.00	1.99

The battery pack voltage can be measured at the terminals shown in the pictures below.





Mitsubishi MR-J2 Low Battery Alarm

The BBR-3.6V-101 is compatible with the low battery alarm in the Mitsubishi MR-J2 servo drive. The alarm is triggered at 3.2 Volts. Since the battery pack has 3 AA batteries in series, this corresponds to a 1.06 Volts per AA cell. At the 1 Volt per cell level, each AA battery only has approximately 10% of its total usable capacity remaining. The batteries should be replaced once the alarm is triggered or the battery pack voltage drops below 3.2 Volts. Fresh/new AA batteries in the battery pack should read approximately 4.8 Volts (approximately 1.6 Volts per cell).

The table below is from the Mitsubishi MR-J2 Instruction manual and lists the alarm codes that are displayed on the LED display in the low battery voltage condition.

Display	Name	Definition	Cause	Action
AL.92	Open battery cable warning	Absolute position detection system battery voltage is low.	1. Battery cable is open.	Repair cable or changed.
			2. Battery voltage supplied from the servo amplifier to the encoder fell to about 3.2V or less. (Detected with the encoder)	Change battery.
AL.96	Home position setting warning	Home position setting could not be made.	1. Droop pulses remaining are greater than the in-position range setting.	Remove the cause of droop pulse occurrence
			2. Command pulse entered after clearing of droop pulses.	Do not enter command pulse after clearing of droop pulses.
			3. Creep speed high.	Reduce creep speed.
AL.9F	Battery warning	Voltage of battery for absolute position detection system reduced.	Battery voltage fell to 3.2V or less. (Detected with the servo amplifier)	Change the battery.

[http://cncbatteries.com/products/supporting_files/Mitsubishi MR-J2 Manual - 138918.pdf](http://cncbatteries.com/products/supporting_files/Mitsubishi_MR-J2_Manual_-_138918.pdf) (Page: 207, 10-13)

Example Installation

Below you will find a series of example installation photos with the BBR-3.6V-101 installed with Mitsubishi MR-J2 servo drives.

