

Charge / Discharge / Cycle (CDC)

Thanks for purchasing an RBbatteries CDC system! This unit will allow you to charge, discharge and cycle the IMA battery in select Honda hybrids. This document will help you get up and running with this system.

Limits:

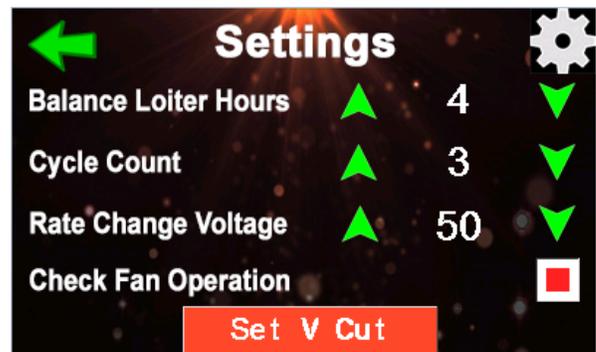
Minimum IMA battery voltage required 15V

Maximum IMA fan current 1.5A

Maximum ambient temperature 90F

Settings, Diagnostics and Errors

1. Connect the unit to the vehicle harness and then connect the AC power to the unit.
2. Switch the unit on.
3. From the **Home** page (picture below left), tap the small cog in the bottom right corner for the **Settings** page (picture below right).



4. The **Balance Loiter Hours** setting tracks the voltage during a charge. Each time a higher voltage during a charge has been reached, a countdown timer starts at the hours set. Adjust the **BLH** as desired. Adjustments can be made in 1 hour increments. The minimum is 1 hour and the maximum is 12 hours. The higher the **BLH** setting the higher and fuller charge the battery will receive. If you increment past 12 hours, the unit will display “Max” and will not auto-terminate the charge and run until manually stopped. **Do not use the “Max” setting during cycling as the charger will not cycle.**

5. The **Cycle Count** refers to the number of times the discharge/charge cycle occurs when **Cycle** is selected from the Home page. The minimum number of cycles is 1 and the maximum is 5. Cycling starts with a discharge. Cycling ends with a charge cycle so you’re ready to go.

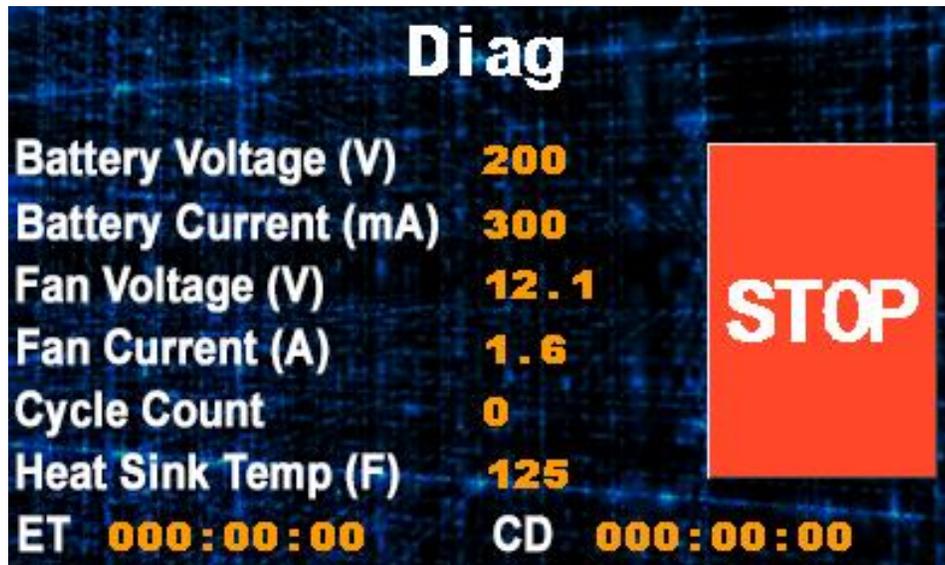
5. The **Rate Change Voltage** refers to the voltage the discharger will switch to the lower discharge rate. The default is 50V. If the battery is above 50V it will discharge at full rate, if it’s below the threshold will discharge at about half rate. If you want to only discharge at the full rate, then set the voltage to 0 volts. If you only want to discharge at the half rate, then set the voltage to 200V. Don’t be concerned if this doesn’t switch rates right at your setting, there is a couple volt hysteresis built in.

6. The **Check Fan Operation** checkbox, when active, will monitor the IMA cooling fan current and make sure it’s running. If the fan fails, the system will throw a fan error message. If you are working with a battery outside of the car, you can uncheck this box and the system will not check for fan problems. It is highly recommended to leave this checked.

7. Tapping the “Set V Cut” gives you access to the **Discharge Settings** page (pictured below). The discharge voltage cut-off setting sets the voltage the battery will discharge down to for each cycle. If doing a discharge only session, the voltage cut-off will use the value from cycle #1. Setting each cut-off at a lower and lower voltage allows the cycling to discharge the battery in nice stepped amounts. The minimum dischargeable voltage is 15V and the maximum is 150V. Suggested cut-offs could be: 120V, 100V, 80V, 60V, 40V.



8. From the **Discharge Settings** page press the green arrow in the upper left. This will return you back to the **Settings** page. Should you need to check any outputs, the **Diag** page (**Diagnostic**) will display all measurements the unit can make. The cog in the upper right corner will take you to the **Diag** page. This page allows you to view all of the values tracked by the charger. No out of bounds errors, normally tracked during charging/discharging/cycling, will be thrown during this page. The descriptions with valid ranges are listed below. This page will timeout after 1 minute and return to the home page. To immediately return to the Home page press **Stop**. Use this page after you install the vehicle harness for checking correct connections. If you do not see a battery voltage, your harness may be installed incorrectly.



Battery Voltage (V) – The high voltage output of the IMA output measured in the unit. If this is disconnected from the vehicle’s IMA battery it will read 220-235V. Valid range of 15V to 200V.

Battery Current (mA) – The amount of current going through the IMA connection. Valid range of 200mA to 350mA during charging and less than 1.5A during discharging.

Fan Voltage (V) – The voltage being applied to the fan. Valid range of 11.5V to 12.5V.

Fan Current (A) – The amount of current going through the fan. Valid range of .3A to 1.5A.

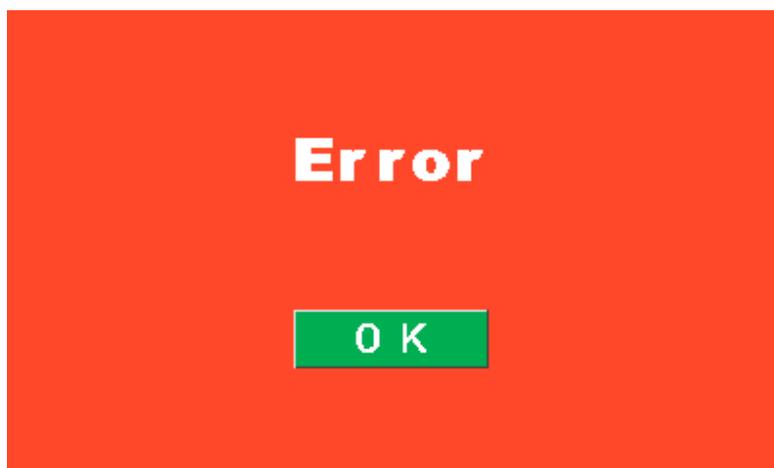
Cycle Count – The current discharge/charge cycle being performed, only updated during a **Cycle** session. You can select from 1 to 5 cycles.

Heat Sink Temp (F) – The temperature of the discharge heat sink. The maximum allowed temperature is 180F before the unit throws an error and shuts down.

ET (Elapsed Timer) – Tracks the amount of time elapsed during the current session. Displayed as HHH:MM:SS.

CD (Countdown Timer) – Tracks the amount of time left on the current charge session, resets every time the highest voltage seen during the current session has been reached. Displayed as HHH:MM:SS.

9. If any errors occur during any sessions, take note of the error. Then switch the unit off, unplug it from the vehicle and then unplug the AC power cord. An error message will be displayed on the error page shown below.



Error Description	Reason for the flagging of the error	Solutions
HV V HIGH HV V LOW	Occurs if the measured IMA battery voltage is greater than 200V or less 15V.	Will occur if the charger is not connected to the vehicle harness or the IMA safety switch is off. Also check the IMA + and IMA – are connected to the correct locations on the battery. IMA + harness fuse or internal AC fuse may be blown.
HV A HIGH HV A LOW	Occurs if the measured IMA battery current is greater than 1.5A or lower than 150mA.	Will occur if there is a short or high current, check the IMA + and IMA – are connected to the correct locations on the battery. Vehicle harness may have come disconnected. IMA + harness fuse or internal AC fuse may be blown.
12V LOW	Occurs if the measured 12V supply is less than 11.5V.	Will occur if the 12V supply is shorted or sagging for some reason.
FAN A HIGH FAN A LOW	Occurs if the measured fan current is greater than 1.75A or less than 250mA.	Will occur if the fan is shorted, pinched fan wires or disconnected fan wires. Internal 12V fuse may be blown.
HS 2 High	Occurs if the measured heat sink temperature is greater than 180F.	Will occur if not enough ventilation for the unit is provided, unit should not be in direct sunlight or ambient temp is too hot, >90F.

10. The **Results** page will display all of the highest and lowest voltages seen at the completion of your session or after the error page if there was an error. If you only selected a charge or a discharge session, only the voltage under cycle 1 will be populated, otherwise they will read 0. The total time to complete the session is also displayed.

Results		
Cycle	Charged V	Discharged V
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
Total Time	000:00:00	OK

Pre-Check

1. Turn the car off and remove key. DO NOT turn on the car during any sessions. Not even ACC.
2. Place the unit in a dry, cool (<90F) and well ventilated area. Ensure the unit has at least 12in of clearance on all sides. Do not use in direct sunlight. Do not set the unit on top of the vehicle.

Charge

1. Connect the unit to the vehicle harness, connect the AC power to the unit and switch on.
2. If the **Balance Loiter Hours** is set as desired, press the charge button on the home page. **Suggested BLH is 4-6.**
3. The amount of time the unit will charge will depend on the State of Charge (SoC) of the battery. It will typically take 5 to 10 hours plus your loiter time setting.
4. When the charge is complete the unit will return to the home page.
5. Switch off the unit, unplug the AC power and then unplug it from the vehicle harness.
6. To instantly recalibrate the State of Charge (SoC) of the IMA system, unplug either cable from the 12V battery for 30 seconds and reconnect, to reset the system. You can also unplug the IMA fuse for 30 seconds.
7. **Never turn the vehicle on with the unit connected to the vehicle harness.**

Discharge

1. Connect the unit to the vehicle harness, connect the AC power to the unit and switch on.
2. If the **Discharge V Cut Off 1** and **Rate Change Voltage** are set as desired, press the discharge button on the home page.
3. The amount of time the unit will discharge will depend on the State of Charge (SoC) of the battery. It will typically take 4 to 8 hours.
4. When the discharge is complete the unit will return to the home page.
5. Switch off the unit, unplug the AC power and then unplug it from the vehicle harness.
6. It is suggested to charge the battery before driving or starting the vehicle.
7. It is suggested to immediately charge the battery after a discharge.
8. **Never turn the vehicle on with the unit connected to the vehicle harness.**

Cycle

1. Connect the unit to the vehicle harness, connect the AC power to the unit and switch on.
2. If the **Balance Loiter Hours, Discharge V Cut Offs, Cycle Count and Rate Change Voltage** are set as desired, press the Cycle button on the home page. The unit starts with a discharge session first.
3. The amount of time the unit will take will depend on the amount of cycles and your discharge/loiter settings. **It can take 10-40 hours per cycle.** The main setting that affects the time is the loiter hours.
4. When the cycling is complete the unit will return to the home page.
5. Switch off the unit, unplug the AC power and then unplug it from the vehicle harness.
6. **Never turn the vehicle on with the unit connected to the vehicle harness.**

Notes of usage:

Normal IMA battery voltages	00-06 Honda Insight	03-05 Civic Hybrid & 05-07 Accord Hybrid	06-11 Honda Civic Hybrid
Nominal Voltage	144	144	158
Maximum Charged Voltage	174	174	190

During charging when the battery hits its maximum voltage, it will start balancing. Let it continue charging by setting the Balance Loiter Hours, default is 4 hours. For example, if you have a battery starting at 120V and begin grid charging, it will start rising in voltage very fast at first. Over time, it rises slower and slower. Eventually it will (approximately) hit a maximum shown in the table above. Once it hits the max voltage, it will start bouncing up and down slowly by a few volts. You may not be able to notice it. Subsequent charging will need to be performed when the assist feels weak or the IMA light comes back on.

During discharging when the battery hits the Discharge V Cut off defined on the settings page, it will stop and return to the home page. Cycling is the combination of discharging and charging.

DANGER HIGH VOLTAGE!!

*****Rbatteries is not responsible for misuse or failure of the products. By installing this device you are accepting any and all responsibility*****

This is enough power to hurt you, be careful! Have questions? Contact me by eBay "Rbatteries" or email "Rbatteries@gmail.com".

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