

CCR Load Calculator Instructions

This calculator will allow you to quickly and easily determine the load on a Constant Current Regulator.

General Instructions:

- Fill in the overall circuit information on the System Parameters tab.
- Fill in specific load data information on one or more of the following tabs.
- Go to the Load Summary tab to see summary information and calculated load.
- You can then optionally elect to insert the summary information in a generic Excel spreadsheet. Repeat the process for each CCR. These can be inserted one after the other in a separate generic spreadsheet.

System Parameters Tab

- A. Type in the airport name.
- B. If applicable, type in the identification of the series circuit identifier or CCR name.
- C. Select maximum CCR output current (6.6A or 20A) from the drop down list.
- D. Select number of CCR steps.
- E. Select Input voltage or type in the voltage.
- F. Select operating frequency (50 or 60Hz) from the drop down list.
- G. Select whether the series circuit wire will be calculated in meters or feet. Based on this selection, all wire length entries in the spreadsheet will change to meters or feet.
- H. Select the CCR architecture (Thyristor or Ferroresonant) from the drop down list or type in a different architecture.
 - a. For any type of Runway Guard Light load using ADB CCRs, Ferroresonant should be used.
 - b. For any L-849 application with xenon flash lamps using ADB CCRs, Ferroresonant should be used. An ADB Thyristor CCR may be used if at least half of the load is a steady burning load.
- I. Type in the estimated roundtrip length of the series circuit wire.
- J. Select L-824 wire gauge (6 AWG or 8AWG) from the drop down list. 6 AWG is normally used on 20A circuits and 8 AWG is normally used on 6.6A circuits.
- K. Type in the L-824 wire resistance. Data for Tamaqua L-824 wire is shown. If necessary, consult other L-824 manufacturer's catalog sheets for their specific resistance values.

The calculated load due to the L-824 wire is automatically shown. This number is automatically inserted into the Load Summary tab.

Depending on the components on the CCR output, you will then select one or more of the following tabs and input the data.

Lamp Load Tab

This tab is used to calculate the CCR load for fixtures that use Tungsten-Halogen or Incandescent lamps. Four different types of fixtures can be calculated on this tab.

- A. Select the fixture FAA Type designator from the drop down list or type in a different description.
Note: Stop Bar (L-852S; L-862S, L-852G/S) or Runway Guard Light (L-852G, L-804) fixtures are calculated in later tab(s).
- B. Type in fixture manufacturer name. If more than one manufacturer (using the same lamp wattage), type in all names.
- C. Type in the total quantity of the specific fixture entered in (A).
- D. For a single lamp fixture, type in the lamp wattage. For a multiple lamp fixture, type in the maximum possible lamp wattage.
- E. This calculation considers the additional load due to long secondary wires between the fixture and the isolation transformer. An example would be if the isolation transformer is located on the side of a runway for a L-850B (Touchdown Zone) application. Select "No" if the transformer is located in base can underneath the fixture. This calculation will: 1.) Indicate if a larger isolation transformer is needed and 2.) Account for the additional secondary wire load on the CCR.
 - a. Type in the estimated roundtrip length of the isolation transformer series circuit wire.
 - b. Select the isolation transformer secondary wire gauge (12 AWG or 16AWG) from the drop down list or type in a different gauge. 12 AWG is normally used on 20A circuits and 16 AWG is normally used on 6.6A circuits. Note that 12 AWG wire can optionally be used on 6.6A circuits if it is desired to reduce the load on the isolation transformer.
 - c. If you selected AWG 12 or 16 in (b), a wire resistance is automatically inserted. If the wire you are using has a different resistance, type in the wire resistance in ohms/1000 feet or meters.
- F. Type in any other load not accounted for in the calculator.
- G. This shows the total load on the secondary of the isolation transformer.
- H. Select the isolation transformer wattage from the drop down list. Use the total transformer load shown in (G) to pick the correct isolation transformer size. It is understood that the following FAA transformer types are combined into one transformer: 10/15W, 20/25W and 30/45W. However, for the calculator to correctly insert transformer losses, pick the wattage closest to the load on the isolation transformer secondary. So, for example, if a 30W L-861T taxiway edge light is used select 30W in the drop down list. The actual transformer installed will be a 30/45W type.
- I. What if the isolation transformer load is slightly more or less than the available isolation transformer wattage? As a general rule of thumb, it is always better to slightly overload an isolation transformer than highly under load it. Some examples:
- J. Use a 45W transformer if the lamp is 48W (A 48W lamp is used on ADB L-850A uni directional runway centerline fixtures and ADB L-850B touchdown zone fixtures).
- K. Use a 100W transformer if the total lamp wattage is 96W (Example: Two 48W lamps are both energized on a ADB L-850A bi-directional runway centerline fixture that has one cord-set).
- L. Use a 100W transformer if the lamp is 120W (A 120W lamp is commonly used on ADB L-861SE, L-862 and L-862E fixtures).



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- M. Use a 200W transformer if the total lamp load is 210W (Example: Two 105W lamps are both energized on a ADB L-850C bi-directional runway edge fixture that has one cord-set).
- N. If you are not sure what isolation transformer to use: 1.) Check the installation guidance in the Product Center on our web site at www.adb-airfield.com, 2.) Contact the ADB Sales department for assistance or 3.) Contact your transformer manufacturer.
- O. Isolation transformer losses are automatically inserted here based on the transformer size you selected in (H).

The total CCR load associated with Fixture Number 1 is then automatically shown.

Repeat this process for any other type of Tungsten Halogen/Incandescent lamp fixtures on the series circuit. Up to four different types of fixtures can be calculated on this tab. The total number for all fixture types is automatically inserted in the Total Tungsten Halogen/Incandescent Lamp Load at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

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LED Load Tab

This tab is used to calculate the CCR load for fixtures that use Light Emitting Diodes (LEDs). This page also includes LED Sign, RGL, REIL and Windcone information.

- A. Select the fixture FAA Type designator from the drop down list or type in a different description.
- B. Type in fixture manufacturer name. If more than one manufacturer, type in all names (assuming the LED fixture load is the same).
- C. Type in the total quantity of the specific fixture entered in (A).
- D. Type in the LED fixture VA.
- E. This calculation considers the additional load due to long secondary wires between the fixture and the isolation transformer. An example would be if the isolation transformer is located on the side of a taxiway for a L-852 (Taxiway Centerline) application. Select "No" if the transformer is located in base can underneath the fixture. This calculation will: 1.) Indicate if a larger isolation transformer is needed and 2.) Account for the additional secondary wire load on the CCR.
 - a. Type in the estimated roundtrip length of the isolation transformer series circuit wire.
 - b. Select the isolation transformer secondary wire gauge (12 AWG or 16AWG) from the drop down list or type in a different gauge. 12 AWG is normally used on 20A circuits and 16 AWG is normally used on 6.6A circuits. Note that 12 AWG wire can optionally be used on 6.6A circuits if it is desired to reduce the load on the isolation transformer.
 - c. If you selected AWG 12 or 16 in (b), a wire resistance is automatically inserted. If the wire you are using has a different resistance, type in the wire resistance in ohms/1000 feet or meters.
- F. Type in any other load not accounted for in the calculator.
- G. This shows the total load on the secondary of the isolation transformer.
- H. Select the isolation transformer wattage from the drop down list. Use the total transformer load shown in (G) to pick the correct isolation transformer size. It is understood that the following FAA transformer types are combined into one transformer: 10/15W, 20/25W and 30/45W. However, for the calculator to correctly insert transformer losses, pick the wattage closest to the isolation transformer load. So, for example, if a L-861T taxiway edge light with 11.2VA is used, select 15W in the drop down list. The actual transformer installed will be a 10/15W type.
- I. Isolation transformer losses are automatically inserted here based on the transformer size you selected in (H).

The total CCR load associated with Fixture Number 1 is then automatically shown.

Repeat this process for any other type of LED fixtures on the series circuit. Up to four different types of fixtures can be calculated on this tab. The total number for all fixture types is automatically inserted in the Total LED Load at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

Sign Load Tab

This tab is used to calculate the L-858 Sign loads. Five different sign configurations can be calculated on this tab.

- A. Select the Sign manufacturer's name from the drop down list or type in a different name.
- B. Select the FAA L-858 Sign Size from the drop down list.
- C. Select the number of continuous modules from the drop down list. Note that FAA signs are limited to 4 modules max. If for example, there is a need for a message that has 6 modules, this would typically be installed as one 4-module sign mounted in-line with a 2-module sign. For the load calculator, you would separately enter data for a 4-module and a 2-module sign.
What if the L-858 is a single long continuous (no modules or separators) sign? From the drop down box, select the number of modules that are physically equivalent to the length of the continuous sign.
- D. Select the Lamp Type from the drop down list or type-in.
- E. Select the Sign Power Architecture from the drop down list or type-in.
- F. Select the Sign Style from the drop down list.
- G. For ADB Tungsten-Halogen or Fluorescent signs, the Transformer Used will be auto-inserted. For any other sign configuration, type in the transformer wattage used.
- H. For ADB Tungsten-Halogen or Fluorescent signs, the Sign VA will be auto-inserted. For any other sign configuration, type in the VA as seen on the primary of the isolation transformer using the manufacturer's catalog sheet data.

The total CCR load associated with Sign Load Number 1 is then automatically shown.

Repeat this process for any other configuration of signs on the series circuit. Up to five different configurations can be calculated on this tab. The total CCR load for all sign configurations is automatically inserted in the Total L-858 Sign Load at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

In-pavement RGL Tab

This tab is used to calculate the CCR load for L-852G In-pavement Runway Guard Lights.

- A. The FAA designator is L-852G.
- B. Select the manufacturer's name from the drop down list or type in a different name.
- C. Select the lamp wattage from the drop down list or type in a different wattage.
- D. From the drop-down list, select if the fixtures are Monitored or Unmonitored. Monitored means there is an electronic system that automatically detects and reports lamps-out. Unmonitored means that there is only visual monitoring of lamps-out. However, there will be a device to pulse the fixtures that will add load to the CCR.
- E. Select the Transformer wattage from the drop down list or type in a different wattage.
- F. This calculation considers the additional load due to long secondary wires between the fixture and the isolation transformer. An example would be if the isolation transformer is located on the side of the taxiway. Select "No" if the transformer is located in base can underneath the fixture. This calculation will: 1.) Indicate if a larger isolation transformer is needed and 2.) Account for the additional secondary wire load on the CCR.
 - a. Type in the estimated roundtrip length of the isolation transformer series circuit wire.
 - b. Select the isolation transformer secondary wire gauge (12 AWG or 16AWG) from the drop down list or type in a different gauge. 12 AWG is normally used on 20A circuits and 16 AWG is normally used on 6.6A circuits. Note that 12 AWG wire can optionally be used on 6.6A circuits if it is desired to reduce the load on the isolation transformer.
 - c. If you selected AWG 12 or 16 in (b), a wire resistance is automatically inserted. If the wire you are using has a different resistance, type in the wire resistance in ohms/1000 feet or meters.
- G. Select the name of the pulsing device used from the drop down list or type in a different name.

G1 and G2: If one of the pulsing device drop-down items was selected, the load VA is auto-inserted. If a pulsing device name was typed in, the VA loads as seen on the primary of the isolation transformer must be typed in.
- H. Type in the total number of L-852G fixtures on the circuit.
- I. Type in any other load not accounted for in the calculator.
- J. Type in the electronic monitoring device (Master) load if present.

The summary of the load is automatically inserted at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

Elevated RGL Tab

This tab is used to calculate the CCR load for L-804 Elevated Runway Guard Lights.

- A. The FAA designator is L-804.
- B. Select the manufacturer's name from the drop down list or type in a different name.
- C. Select the lamp wattage from the drop down list or type in a different wattage.
- D. Select the type of pulsing device from the drop down list or type in a different name.
- E. This calculation considers the additional load due to long secondary wires between the fixture and the isolation transformer. An example would be if the isolation transformer is located on the side of the taxiway. Select "No" if the transformer is located in base can underneath the fixture. This calculation will: 1.) Indicate if a larger isolation transformer is needed and 2.) Account for the additional secondary wire load on the CCR.
 - a. Type in the estimated roundtrip length of the isolation transformer series circuit wire.
 - b. Select the isolation transformer secondary wire gauge (12 AWG or 16AWG) from the drop down list or type in a different gauge. 12 AWG is normally used on 20A circuits and 16 AWG is normally used on 6.6A circuits. Note that 12 AWG wire can optionally be used on 6.6A circuits if it is desired to reduce the load on the isolation transformer.
 - c. If you selected AWG 12 or 16 in (b), a wire resistance is automatically inserted. If the wire you are using has a different resistance, type in the wire resistance in ohms/1000 feet or meters.
- F. This shows the total calculated Transformer load.
- G. If a 100W isolation transformer was selected in (F), transformer loss is automatically inserted. Otherwise, type in the transformer loss.
- H. Type in the total number of L-804 fixtures on the circuit.
- I. Type in any other load not accounted for in the calculator.
- J. From the drop-down list, select if the fixtures are Monitored or Unmonitored. Monitored means there is an electronic system that automatically detects and reports lamps-out. Unmonitored means that there is only visual monitoring of lamps-out. However, there will be a device to pulse the L-804s that will add load to the CCR.
- K. Type in the electronic monitoring device (Master) load if present.

The summary of the load is automatically inserted at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

Stop Bar Tab

This tab is used to calculate the CCR load for Stop Bar devices.

In-pavement Stop Bar

- A. Select, from the drop down list, whether the in-pavement stop bar fixture is a single lamp red L-852S or a dual lamp red/yellow L-852G/S.

For the remaining items, use similar guidance as given for the Lamp Load tab.

Elevated Stop Bar

Use similar guidance as given for the Lamp Load tab.

Sensor Load

Enter specified data from manufacturer's catalog sheets. Typically microwave sensors or inductive loops are used.

In-pavement RGL Load:

Use similar guidance as given for the L-852G tab.

Elevated RGL Load:

Use similar guidance as given for the L-804 tab.

Control/Monitoring Interface Device Load: Enter specified data.

- A. Type in the electronic monitoring device (Master) load.
- B. Type in any other load not accounted for in the calculator.

The summary of the load is automatically inserted at the bottom of the tab. This number is also automatically inserted into the Load Summary tab.

Other Load(s) Tab

This tab is used to calculate the CCR load for any other devices not covered in other tabs. Ten different types of devices can be calculated on this tab. For each section:

- Select Other Load description from the drop down list or type in.
- Type-in the Device VA
- Type-in the Type of Isolation Transformer used, if any.

*Note: If the number entered for the **Device VA** already accounts for transformer losses, leave this field blank.*

- Type-in the Isolation Transformer in VA, if any.

*Note: If the number entered for the **Device VA** already accounts for transformer losses, leave this field blank.*

- Type-in other load losses in VA, if any.
- Type-in total quantity of devices.

The total load for this device is then automatically inserted at the bottom of the section. This number is also automatically inserted into the Load Summary tab.

The same process is repeated for the other sections.

Following are some examples:

Other Load(s)	
<p>1. Other Load Description (Select From Dropdown or Type-in) L-849A/C/E REIL with PA-4</p> <p>Device VA <input type="text" value="300"/> VA</p> <p>Isolation Transformer Used (if any) <input type="text"/></p> <p>Isolation Transformer Losses (if any) <input type="text"/></p> <p>Other Losses (if any) <input type="text"/></p> <p>Quantity <input type="text" value="1"/></p> <p>Total Load <input type="text" value="300"/> VA</p>	<p>2. Other Load Description (Select From Dropdown or Type-in) L-880 Type B (Current Driven) 2-Lamp Optical Box, with heater</p> <p>Device VA <input type="text" value="1960"/> VA</p> <p>Isolation Transformer Used (if any) <input type="text"/></p> <p>Isolation Transformer Losses (if any) <input type="text"/></p> <p>Other Losses (if any) <input type="text"/></p> <p>Quantity <input type="text" value="2"/></p> <p>Total Load <input type="text" value="3920"/> VA</p>
<p>3. Other Load Description (Select From Dropdown or Type-in) LED L-849I Style E (3-step)</p> <p>Device VA <input type="text" value="200"/> VA</p> <p>Isolation Transformer Used (if any) <input type="text" value="200"/></p> <p>Isolation Transformer Losses (if any) <input type="text" value="20"/></p> <p>Other Losses (if any) <input type="text" value="0"/></p> <p>Quantity <input type="text" value="2"/></p> <p>Total Load <input type="text" value="440"/> VA</p>	<p>4. Other Load Description (Select From Dropdown or Type-in) <input type="text"/></p> <p>Device VA <input type="text"/> VA</p> <p>Isolation Transformer Used (if any) <input type="text"/></p> <p>Isolation Transformer Losses (if any) <input type="text"/></p> <p>Other Losses (if any) <input type="text"/></p> <p>Quantity <input type="text"/></p> <p>Total Load <input type="text" value="0"/> VA</p>

Load Summary Tab

This tab shows the summary of all load calculations including the Total Calculated CCR Load.

Type in the desired CCR Load Safety Factor.

The “CCR Load with Safety Factor” and the “Next Largest CCR Size” is then automatically calculated.

The “Actual CCR Safety Factor” is then shown based on the CCR Size selected.

If a Thyristor CCR was selected in the System Parameters tab, a suggested tap setting is automatically calculated. The calculator assumes that taps in 10% increments are available on the CCR.

This spreadsheet is password protected. If it is desired to export the Load Summary data to an unprotected worksheet, click on the **Export** button. A new window, called “Book1” is created with all the Load Summary Data. This may be used, for example, to create your own summary spreadsheet for all CCRs in a vault.

You can then revise the Load Calculator data as needed for different CCRs. Clicking on the **Export** button again will create a “Book2.xls, Book3.xls, etc.

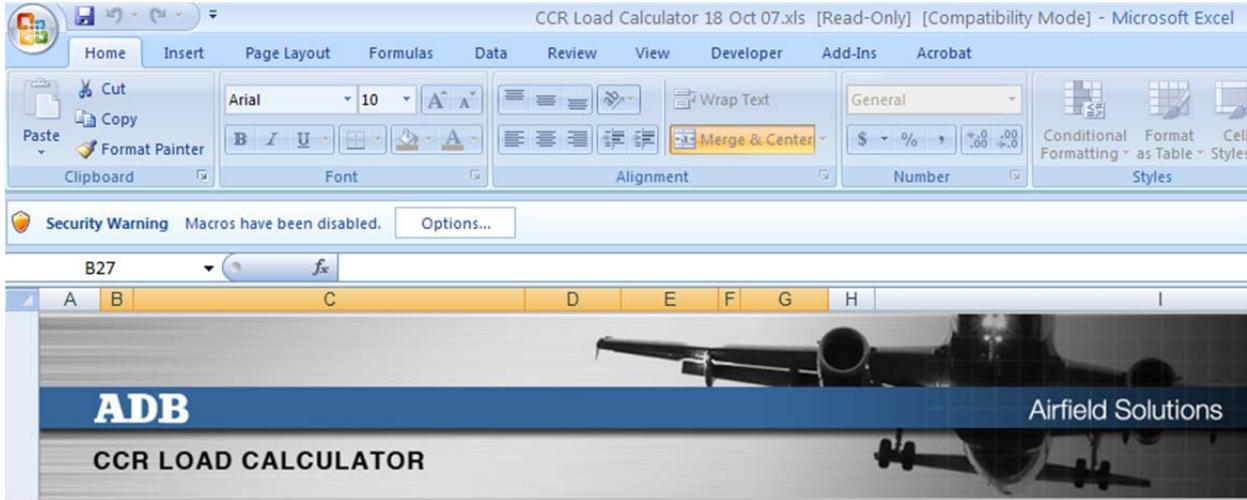
A Note about Isolation Transformer Losses

If you are not sure what the isolation transformer loss is, use the following guidance. For example, if a 65W 6.6A/6.6A L-830 is used; enter 13 for isolation transformer losses.

TYPE (AC 150/5345-47)	Wattage	Ratio Prim/Sec	Efficiency %	Max VA
L-830-1	30/45	6.6A/6.6A	80	6/9
L-830-2	30/45	20A/6.6A	80	6/9
L-830-3	65	6.6A/6.6A	80	13
L-830-4	100	6.6A/6.6A	85	15
L-830-5	100	20A/6.6A	85	15
L-830-6	200	6.6A/6.6A	90	20
L-830-7	200	20A/6.6A	90	20
L-830-8	300	6.6A/20A	90	30
L-830-9	300	20A/20A	90	30
L-830-10	300	6.6A/6.6A	90	30
L-830-11	300	20A/6.6A	90	30
L-830-12	500	6.6A/20A	90	50
L-830-13	500	20A/20A	90	50
L-830-14	500	6.6A/6.6A	90	50
L-830-15	500	20A/6.6A	90	50
L-830-16	10/15	6.6A/6.6A	70	3/4.5
L-830-17	20/25	6.6A/6.6A	70	6/7.5
L-830-18	150	6.6A/6.6A	85	22.5
L-830-19	150	20A/20A	85	22.5

Troubleshooting the CCR Load Calculator

Security Warning Macros have been disabled.



If you see the above message when you open the CCR Load Calculator in Excel 2007 or later, your security settings for Excel are set too high to allow the macros to be enabled. For the CCR Load Calculator to run properly enable macros.

Click on the Options button, and select: Enable this content



In earlier versions of Excel you will see the message:

Macros in this workbook are disabled because the security level is high, and the macros have not been digitally signed or verified as safe. To run the macros, you can either have them digitally signed or change your security level. Click help for more information.

Go under the Tools Menu to Options. Click on the Security tab, and you'll see the dialog box on the left. Click on Macro Security, and under Security Level (dialog box on the right), select Medium and click OK twice. The next time you open the CCR Load Calculator, you should get a dialog box asking if you want to enable macros. If you want the CCR Load Calculator to automatically fill in numbers in response to your input, you need to click on the Enable Macros button.