

A89DC-08 – DC Current Monitor

Obvius, LLC

Installation and Operation Manual

Model A89DC-08

Date Jun 21, 2010

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 DANGER
Hazard of Electric Shock, Explosion or Arc Flash
<ul style="list-style-type: none">● Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.● This equipment must only be installed and serviced by qualified electrical personnel.● Read, understand and follow the instructions before installing this product.● Turn off all power supplying equipment before working on or inside the equipment. Use properly rated voltage sensing device to confirm power is off. DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION● Only install this product on insulated conductors. Failure to follow these instructions will result in death or serious injury.

NOTICE
<ul style="list-style-type: none">● This product is not intended for life safety applications.● Do not install this product in hazardous or classified locations.● The installer is responsible for conformance to all applicable codes.● Mount this product inside a suitable fire and electrical enclosure.

FCC Part 15 Information

Note: This equipment has been tested by the manufacturer and found to comply with the limits of a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications of this product without the express authorization of Obvius nullify this statement.

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Markings and Symbols:

WARNING: A potential risk exists if the operating instructions are not followed



General Warning Symbol: This symbol indicates the need to consult the operating instructions provided with the product.



This symbol indicates the presence of electric shock hazards.



This symbol indicates: Do not apply to or remove from hazardous live conductors.

=== Direct Current symbol.

Overview

The A89DC-08 DC current monitor system is designed to allow measurement and alarming of DC current applications including solar pv arrays, battery monitoring and DC power supplies for telecom switch gear.

The A89DC-08 uses 8 non-contact DC Hall Effect sensors to measure DC current on each of the 8 channels. DC current can be measured in both directions, showing positive and negative numbers in the resulting measurement values. Data values are made available via RS485 serial using the standard Modbus RTU protocol.

In addition to reporting the current values of each channel, the A89DC-08 also provides alarm functions to monitor imbalances between channels. This feature is instrumental in detecting failed equipment in applications such as Solar PV arrays.

Applications

The A89DC-08 DC Current Monitor has several applications. These include:

- DC Load Monitoring.
- Solar PV Power Generation
- Battery Charge and Discharge monitoring.

Installation Checklist

An A89DC-08 system installation has the following components:

Required hardware

- A89DC-08 DC current monitor (required)
- 24VDC power supply
- Data connection to a Modbus master device such as an AcquiSuite, ModHopper, PLC or computer software such as the Obvius Config Console.
- Enclosure for the A89DC-08 DC to satisfy UL safety requirements.
- Shielded twisted pair wire for communications.

Note: If using the Obvius Config Console software, an RS232/DB9 or RS485/55 serial cable will be required to attach the A89DC-08 to the computer.

Hardware Overview

A89DC-08 Features and Specifications

Processor	Arm7 embedded CPU
LED	Alive (green), RS485 TX, RX (yellow)
Protocol	Modbus RTU
Addressing	Modbus address may be set from 1 to 247 via Modbus register.
Power Supply	Power input : 24vdc at 382mA. (power supply not included)
Inputs ²	8 DC Hall Effect Sensors, non-contact. Maximum range +50Amps to -50Amps DC at 600vdc The Hall Effect sensor openings are intended to be used with Insulated wire. Cat I measurement device ⁴ 0.49 inch by 0.35 inch opening for load wire.
Accuracy	+/- 1% of full scale (+/- 0.5A)
Measurements	DC current per channel, instantaneous and average Total DC current (sum of 8 channels), instantaneous and average Average DC current (of 8 channels), instantaneous and average
Alarming	Low alarm may set as a percent of DC average of other channels. Alarms may be disabled below a minimum average current level. Minimum time for alarm may be set to prevent alarms on brief events. Unused channels may be disabled to exclude them from total and average calculations.
Communications ¹	RS-485 (+, -, S), 9600 baud, N, 8, 1, two wire. Supports up to 32 external devices (expandable)
Isolation	The RS485 terminals electrically isolated to 1500V from the remainder of the A89DC-08 board.
Environmental ²	North America: Temperature 0° – 60°c ³ , 0 – 95% humidity, non-condensing. Pollution Degree 2, Altitude up to 2000M. For indoor and outdoor use when used in an appropriate enclosure. The A89DC-08 must be mounted inside a NEMA rated electrical enclosure for safety and isolation requirements.
Safety	UL61010 Recognized File: E320540 (Model A89DC-08)
EMC	FCC CFR 47 Part 15, Class A
Size	10.25" x 2.5" x 1.75" (260mm x 64mm x 45mm)
Mass	0.83 lbs (0.375 kg)

¹ Outputs are intended for low voltage class 2 inputs.

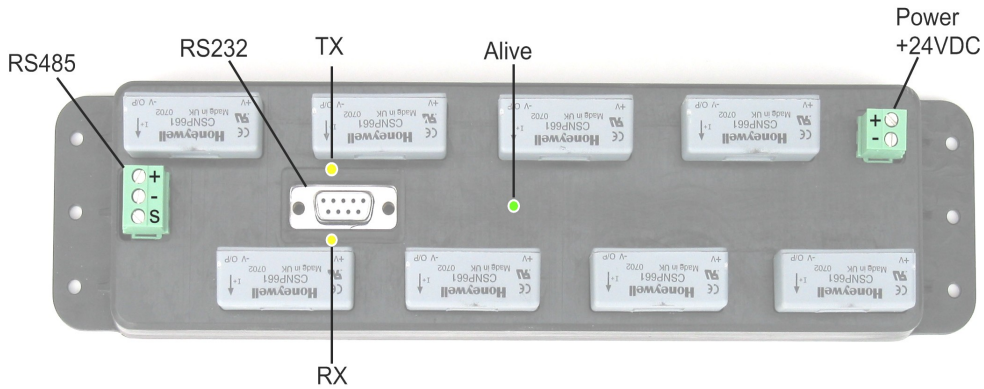
² If the product is used in a manner not specified by the manufacture, the protection provided by the equipment may be impaired.

³ May be dependent on forced air cooling. See chapter on temperature in this manual for details.



WARNING: ⁴Not for use within measurement categories II, III or VI

Power and Communication Connections



Hardware Installation

Step 1 - Unpack materials: Remove all materials from shipping box and verify all required components are available

Step 2 - Mount the A89DC-08 inside the electrical enclosure. Be sure to provide enough room to route the load wires through the hall effect sensor openings.

Step 3 – Attach the power supply to the A89DC-08. Be sure to observe the polarity. Note: Power can be disconnected by removing the screw terminal plug from the A89DC-08 power connection socket.

Step 4 - Connect the RS485 Modbus network loop as shown in the wiring diagram. Follow the manufacturer’s instructions for installing and powering the Modbus Master device. Verify that the Modbus address settings are unique for each device (i.e., no two devices with the same address). Connect each device in the chain by “daisy-chaining” the devices together . Observe + and - polarity on the Modbus devices. For more information about Modbus loops, please read our Modbus FAQ available at www.obvius.com.

Do not ground the RS485 shield inside the electrical panel. All RS485 and 24vdc power wires, including the shield should be insulated to prevent accidental contact to high voltage conductors.

The RS485 and 24vdc power cable should be mechanically secured where it enters the electrical panel.

The wire used to provide RS485 communications should be insulated to meet requirements of the voltages present inside the box that the A89DC-08 is mounted within. For example, Belden 1120A has a 600v insulation rating and can be used in many applications. Check with your electrical installer for details as local code requirements may vary.

⚠ WARNING: After wiring the Modbus RS485 cable, remove all scraps of wire or foil shield from the electrical panel. This could be dangerous if wire scraps come into contact with high voltage wires.

The RS232 connector is provided for firmware updates only. The RS232 connector must not be attached to anything while the A89DC-08 is used in normal operation.

Step 5 - Power-up the A89DC-08. Observe the LEDs to confirm the device is operating.

- **Alive (green):** blinks once per second while the system is operating correctly.
- **RS485 RX:** The RX led should blink whenever a modbus query is sent on the RS485 loop. (regardless of the target address of the query). If the A89DC-08 is attached to an AcquiSuite or a ModHopper device, the RX led should blink about once per second.
- **RS485 TX:** The TX LED will blink when the A89DC-08 responds to a modbus query.

Step 6 - Set the Modbus Address. The default Modbus address of the A89DC-08 is set at the factory between 1 and 128, and is printed on the product packaging label. If other A89DC-08 devices are to be used in the system, you must verify the Modbus address on each is unique one to prevent two devices from having the same address.

A Modbus master device or software package is required to configure options on the A89DC-08 as well as read the output data. The Obvius Config Console software (free at www.obvius.com) can be used to configure the A89DC-08 Modbus address or confirm readings from the device. Use the OCC tool to scan for the A89DC-08 if the Modbus Address is not known.

If you are using software or a PLC to communicate with the A89DC-08, write the address value to Modbus register 41010. The address must be between 1 and 247.

If you are using an AcquiSuite Data Acquisition Server, use your web browser to view the AcquiSuite configuration webpage. Locate the A89DC-08 in the Modbus Device List. Click on the device in the list to view the details for the A89DC-08. Next, click the configure button at the bottom of the page, and then the “Advanced” button at the bottom of the configuration page.

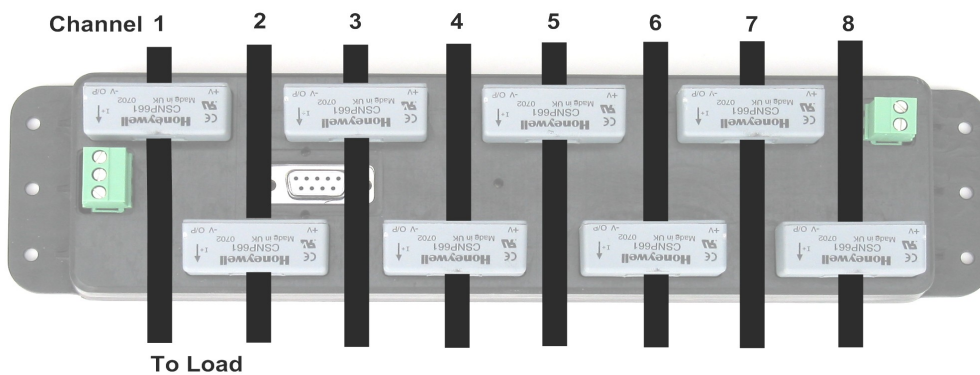
The Advanced configuration button will display a number of parameters for the A89DC-08. One option is the Modbus address. Set the required Modbus address (1-247) and click the save button at the bottom of the page.

Return to the Modbus device list page. It may take several minutes for the AcquiSuite to locate the new address for the device and for the A89DC-08 to appear on the list again. Once it does, click the device and configure a logical name to identify the device in the list.


Step 7 - Once the A89DC-08 is powered up and communications have been confirmed, the DC load wires should be installed. Remove power from the A89DC-08 before installing the load wires.

 **WARNING: Disconnect power and lock-out all power sources during installation. DO NOT CONNECT VOLTAGE OR CURRENT INPUTS LIVE**

Each DC load wire should be run through the opening in the A89DC-08 hall effect sensor. The arrow on the top of the sensor indicates the direction of current flow, and should point in the direction of the load. In a solar PV system, the arrow should point towards the inverter.



This illustration shows the 8 load wires passing through the individual hall effect sensors. The channel number for each load wire is shown at the top.

 **WARNING:** The DC load wire that passes through the hall effect sensor opening must be insulated, and of sufficient thickness to prevent the wire from getting warm due to current flow. Refer to local electrical codes for specific wire size requirements. The DC Load Wire must not make any electrical connection to the A89DC-08. It should only pass through the hall effect sensor opening.

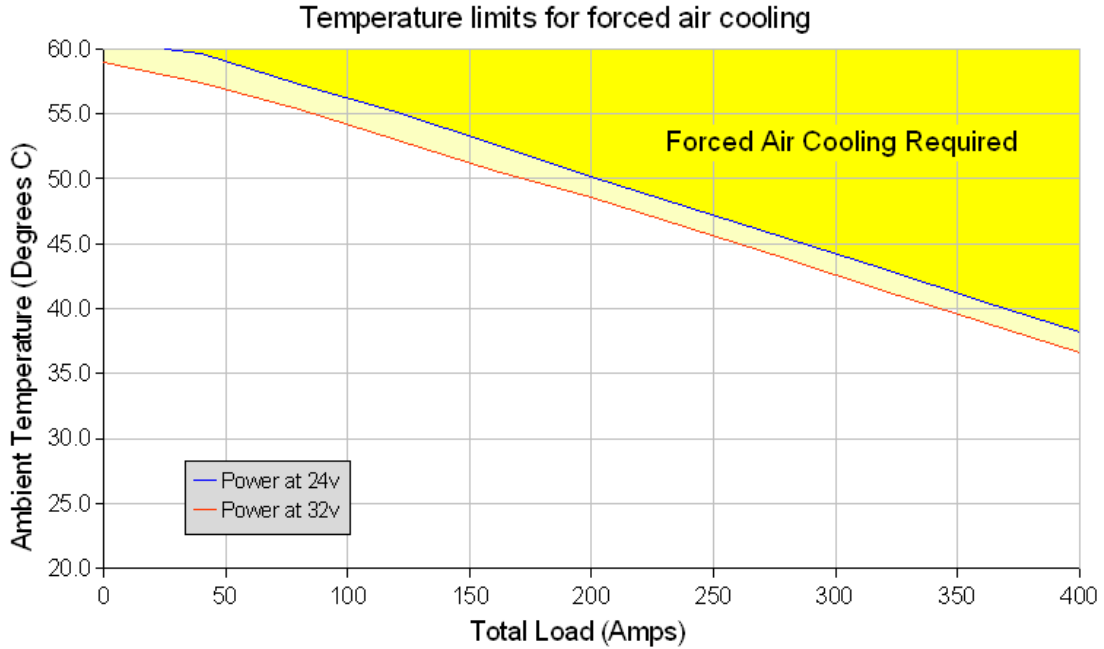
When installing the load wire, do not pull on, or otherwise stress the hall effect sensors.

Step 8: power up the A89DC-08 and the load wires and confirm the readings match the expected current flow.

Note: If cleaning is required, use a dry towel to remove dust from the A89DC-08. Do not use fluids to clean the A89DC-08.

Temperature

The A89DC-08 may generate a fair amount of heat depending on the total current load being monitored. If the A89DC-08 is to be mounted in a sealed enclosure outdoors, care should be taken to ensure the device does not overheat. The heat generated by the A89DC-08 is proportional to the total of load current being monitored. In situations where high load current is to be monitored, and the ambient air temperature will be above room temperature, forced air cooling will be required. The chart below shows this requirement.

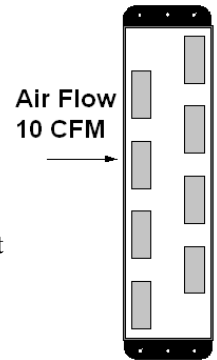


When using the chart above, the total current being monitored on all 8 channels should be used averaged over a 1 minute period. The chart assumes long term current levels at a steady state. Infrequent peaks lasting less than 30 seconds (such as inrush current) should not be used for this calculation.

For example, if the power being monitored will be a maximum of 200Amps (total of all channels) and the ambient air exceeds 50c, forced air cooling will be required.

To provide forced air cooling, A minimum of 10 CFM across the narrow width of the A89DC-08 is required.

Note: Ambient Air temperature refers to the air immediately surrounding the A89DC-08. This is not the outdoor air temperature. The enclosure that the A89DC-08 is mounted inside may retain some heat and cause the ambient air temperature to be hotter than the surrounding outdoor air temperature.



Monitoring usage:

The A89DC-08 has several data points that may be read using the Modbus protocol.

For each input channel 1 through 8, the A89DC-08 reports a value for the instantaneous and long average current. The instantaneous value is computed using multiple samples of the input channel, averaged together. The instantaneous value will represent an average sampling period not longer than 10 ms. The long average value is computed by averaging the instantaneous values together over several minutes (or hours) of time. The long average should be cleared by writing a zero to Modbus register 41017. The long average can accumulate more than 30 days worth of average value, however it is not stored when the power is removed from the A89DC-08.

The A89DC-08 also computes several system wide values including a total and average value for all channels. For each of these, both an instantaneous and long average value is reported. Total instantaneous current is the sum of the instantaneous values for all 8 channels. If any channels are disabled, the current value for the channel is not included in the totals.

When using the A89DC-08 with the AcquiSuite data acquisition server, the following configuration page will be presented.

Solar Combiner Box #1

Device Address: 90
 Device Type: Obvius, A89DC-08, DC Current Sensor, 8 channel (id=46)
 Status: Ok

Function	Current Reading	Low Alarm	High Alarm	Console
Total Current Inst	-392.53 Amps	0.00 Amps	0.00 Amps	
Total Current Ave	-392.66 Amps	0.00 Amps	0.00 Amps	
Average Current Inst	-49.06 Amps	0.00 Amps	0.00 Amps	
Average Current Ave	-49.08 Amps	0.00 Amps	0.00 Amps	
Alarm Channel	invalid	0	0	
Alarm Age	invalid	0	0	
Channel #1	-48.95 Amps	0.00 Amps	0.00 Amps	
Channel #1 Ave	-48.96 Amps	0.00 Amps	0.00 Amps	
Channel #2	-48.74 Amps	0.00 Amps	0.00 Amps	
Channel #2 Ave	-48.76 Amps	0.00 Amps	0.00 Amps	
Channel #3	-49.00 Amps	0.00 Amps	0.00 Amps	
Channel #3 Ave	-49.01 Amps	0.00 Amps	0.00 Amps	
Channel #4	-49.15 Amps	0.00 Amps	0.00 Amps	
Channel #4 Ave	-49.17 Amps	0.00 Amps	0.00 Amps	
Channel #5	-48.95 Amps	0.00 Amps	0.00 Amps	
Channel #5 Ave	-48.97 Amps	0.00 Amps	0.00 Amps	
Channel #6	-49.21 Amps	0.00 Amps	0.00 Amps	
Channel #6 Ave	-49.23 Amps	0.00 Amps	0.00 Amps	
Channel #7	-49.24 Amps	0.00 Amps	0.00 Amps	
Channel #7 Ave	-49.26 Amps	0.00 Amps	0.00 Amps	
Channel #8	-49.29 Amps	0.00 Amps	0.00 Amps	
Channel #8 Ave	-49.30 Amps	0.00 Amps	0.00 Amps	
PCB Temp	169.2 Degrees F	0.0 Degrees F	0.0 Degrees F	
Power Supply	23.37 Volts	0.00 Volts	0.00 Volts	

Buttons: [XML](#) [LOG](#)

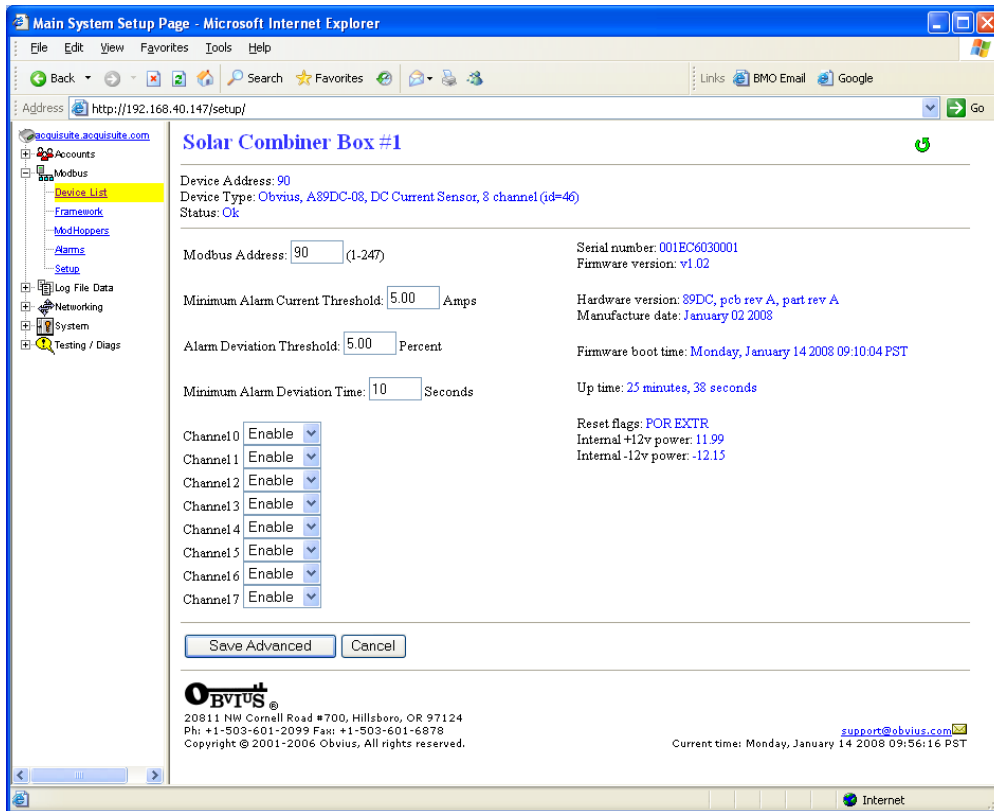
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support@obvius.com
 Current time: Monday, January 14 2008 09:18:25 PST

The AcquiSuite will display will report all the data values present on the A89DC-08. In addition, the long average value will be cleared after each logging interval. Also provided in the AcquiSuite display is the power supply voltage, and onboard pcb temperature. Lastly, the alarm channel will report which channel (if any) are in alarm state based on the failure criteria set up in the advanced configuration page.

AcquiSuite Advanced Configuration Options

The AcquiSuite setup and configuration page includes an advanced configuration page to set all of the A89DC-08 features with a convenient web page interface. Below is an example screen for the AcquiSuite advanced configuration page.



In this setup page, there are several options available.

- The Modbus address field shows the current address, and allows the operator to modify the address.
- The Alarm configuration options are available for the minimum current threshold, alarm deviation threshold, and the minimum alarm time.
- The enable/disable option for all 8 channels is provided.

In addition to the configuration options, some further details about the A89DC-08 are provided. These include the serial number, firmware version, uptime, and internal power supply monitor.

For further information on the alarm configuration options, refer to the Modbus section in this manual.

Modbus Features

Supported Modbus Functions

The A89DC-08 device responds to the following Modbus query functions:

- 0x11 Report slave id.
- 0x03 read holding registers (multiple)
- 0x06 preset single register

These should be sufficient to perform all operations (read many values, make single change, and identify). In addition the device will respond to with Modbus exceptions for invalid function, value, and register if out of bound requests are made.

Modbus function 0x11 Slave ID response should report the following:

"Obvius, A89DC-08, DC Current Sensor, 8 channel", id=46

Modbus Register List

All modbus registers are read-only unless otherwise noted.

Data points: (all read-only)

offset	point	type	description
0	40001	INT32	MSW total current, Instantaneous AMPS * 100, (sum of 8 channels)
1	40002	INT32	LSW total current, Instantaneous AMPS * 100, eg 1234 = 12.34A
2	40003	INT32	MSW total current, long average AMPS * 100 (sum of 8 channels)
3	40004	INT32	LSW total current, long average AMPS * 100 (sum of 8 channels), eg 1234 = 12.34A
4	40005	INT16	average current, Instantaneous AMPS * 100 (average of 8 channels), eg 1234 = 12.34A
5	40006	INT16	average current, long average AMPS * 100 (average of 8 channels), eg 1234 = 12.34A
6	40007	UINT16	Alarm Channel: 0=no-alarm, 0xFFFF=invalid, 1-8=range alarm channel 101=internal -12v power bad 102=internal +12v power bad 103=power input over voltage 104=power input under voltage
7	40008	UINT16	Alarm Time: 0=no-alarm, 0xFFFF=invalid, 1-65534=number of seconds that alarm average has been in effect.
8	40009	INT16	PCB temperature, in degrees F, x 100, eg 12345 = 123.45 deg F
9	40010	UINT16	Input power supply, volts x 100. eg 2345 = 23.45v
10	40011	INT16	channel 1 current, Instantaneous AMPS * 100. eg 2345 = 23.45Amps
11	40012	INT16	channel 2 current, Instantaneous AMPS * 100
12	40013	INT16	channel 3 current, Instantaneous AMPS * 100
13	40014	INT16	channel 4 current, Instantaneous AMPS * 100
14	40015	INT16	channel 5 current, Instantaneous AMPS * 100
15	40016	INT16	channel 6 current, Instantaneous AMPS * 100
16	40017	INT16	channel 7 current, Instantaneous AMPS * 100
17	40018	INT16	channel 8 current, Instantaneous AMPS * 100
18	40019	INT16	channel 1 current, long average AMPS * 100
19	40020	INT16	channel 2 current, long average AMPS * 100

20	40021	INT16	channel 3 current, long average AMPS * 100
21	40022	INT16	channel 4 current, long average AMPS * 100
22	40023	INT16	channel 5 current, long average AMPS * 100
23	40024	INT16	channel 6 current, long average AMPS * 100
24	40025	INT16	channel 7 current, long average AMPS * 100
25	40026	INT16	channel 8 current, long average AMPS * 100

System information points :

offset	point	type	rw/ro	desc
1000	41001	UINT16	ro	Serial Number (bytes 1,2)
1001	41002	UINT16	ro	Serial Number (bytes 3,4)
1002	41003	UINT16	ro	Serial Number (bytes 5,6)
1003	41004	UINT16	ro	firmware version major
1004	41005	UINT16	ro	firmware version minor
1005	41006	UINT16	ro	mfg date MSW
1006	41007	UINT16	ro	mfg date LSW
1007	41008	UINT16	ro	up time (seconds) MSW.
1008	41009	UINT16	ro	up time (seconds) LSW.
1009	41010	UINT16	rw	Our Modbus address (1-247)
1010	41011	UINT16	ro	Hardware Version (8908)
1011	41012	UINT16	ro	PCB Rev (0=rev A, etc) (low byte Part Rev)
1012	41013	UINT16	rw	Minimum current threshold for alarm feature, amps * 100. eg 1234 = 12.34A (x100, 0 to 50 amps)
1013	41014	UINT16	rw	deviation threshold for alarm feature, percent * 100. eg 1234 = 12.34% (0 to 100%)
1014	41015	UINT16	rw	deviation minimum time for alarm feature, in seconds. (0 to 3600 seconds)
1015	41016	UINT16	rw	Channel disable: Bitmap of channels to disable (0x00 = all 8 enabled, 8 bit: 0x00 to 0xFF)
1016	41017	UINT16	w	Ave-clear: write any value to clear long average. (read returns zero)
1017	41018	INT16	ro	Internal Powersupply, +12v rail. (x100, eg 1234 = 12.34v)
1018	41019	INT16	ro	Internal Powersupply, -12v rail. (x100, eg 1234 = 12.34v)
1019	41020	UINT16	ro	reason for reboot. 0x01=POR, 0x02=EXTR 0x04=WDTR 0x08=BODR, 0x8000=WDTOF

Register formatting

The Modbus data register set includes both 16 and 32 bit values, as well as signed and unsigned numbers. On Modbus systems that do not allow you to read 32bit values, you can calculate the pulse count as follows:

$$\text{Total} = (\text{MSW} * 65536) + \text{LSW}$$

When using C or other programming languages, you can combine them with bit shifting and xor.

$$\text{Total} = (\text{MSW} \ll 16) | \text{LSW};$$

It is important to read both the MSW and LSW values in a single Modbus read request. Use the Modbus function 0x03 to read all the Modbus data registers in a single block, and then assemble the data point values from the Modbus registers received in the query. If the MSW and LSW values are read in separate queries, the value may be updated between Modbus queries and the resulting combined number may be incorrect.

Data points such as the total and per-channel current measurements are provided as signed values to represent both positive and negative current flow. A positive value represents current flow in the direction of the arrow on the top of the hall effect sensor. Signed values are encoded in standard two's compliment format.

Alarm configuration

The A89DC-08 provides features to detect alarm conditions related to Solar PV applications. For example, in a PV array, the system may have 10 pv panels wired in series per string, and 8 strings that run back to a combiner box. The A89DC-08 can be installed at the combiner box to monitor the current levels on all 8 strings at the same time. If a panel in one of the strings fails, the A89DC-08 can detect the reduction in current from the failed string and set an alarm flag to indicate the problem.

To configure the A89DC-08 to detect this fault condition, several options must be configured. These options include the following:

- Deviation threshold.
- Minimum current threshold.
- Minimum deviation time for alarm.

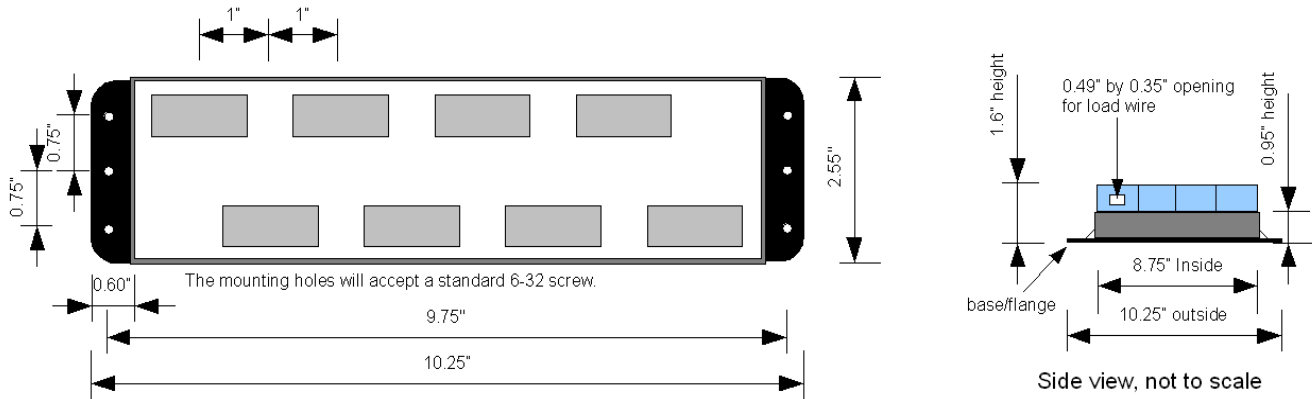
The first item to do is calculate what level you need to detect. If you have 10 panels in series and one fails, there should be a 10% reduction in power production. The deviation threshold should be set less than but close to 10%. A good starting point will be 7%, and then adjust the set point after the system has some working data to review.

The second item is the minimum current threshold. In a solar PV system, the total current produced varies throughout the day. At sunrise and sunset, the amount of power produced is minimal. The minimum level at which the A89DC-08 can detect current is 0.5A, so the differences between channels will be below the ability of the A89DC-08 to detect. To prevent this, the minimum current threshold option sets the point at which current levels must reach in order to enable the alarm feature. If the minimum current threshold is set to 4 amps, the alarm feature will become operational when the average current per channel level exceeds 4 amps. A good value to set for this option is the maximum current expected, less 10%. This will allow the average to exceed the minimum current threshold even if one channel fails completely.

The third feature that you must set is the minimum deviation time for alarm. This feature allows you to select the period of time which the alarm must be in effect before it is reported. This will help suppress transient alarms when brief problems occur such as shadows from a truck or plane are present on one or more panels in a single string.

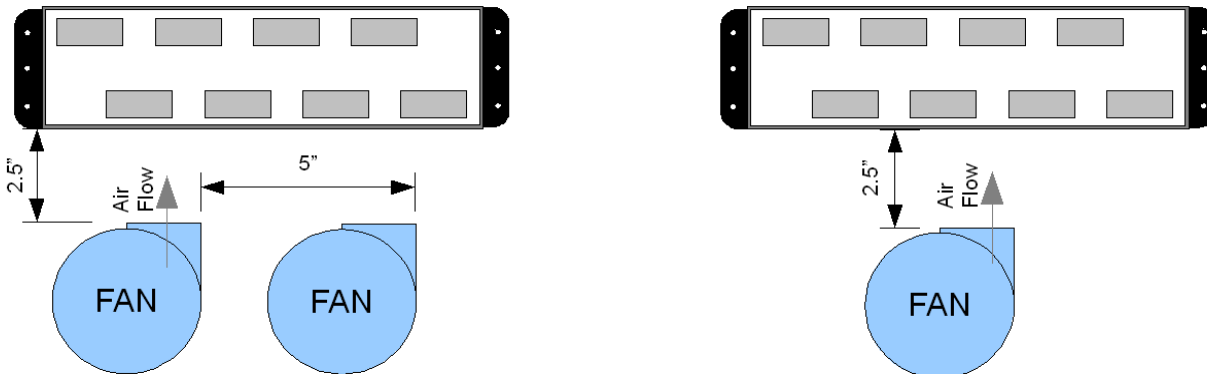
Mechanical Drawings

The A89DC-08 must be mounted inside an appropriate enclosure rated for the weather, location, and electrical components located inside it. The A89DC-08 mounting holes are detailed below.



Forced Air Cooling Application Note:

For use in high temperature environments, a fan may be required. The following drawing shows one example of forced air cooling that can be used with the A89DC-08



The examples show use of a single fan and two fans. While airflow from a single fan is acceptable, two fans provides some redundancy in case of mechanical failure. The fan should be capable of at least 10cfm. A thermostatic switch can also be used to turn on the fan above specific temperatures.

The enclosure should include at least 1/2 cu ft of air volume per A89DC-08. For example, an A89DC-08 can be mounted in a box that is 12" x 12" x 6" with one or two fans.

Recommended fan: NMB-MAT BG0703-B054 (24vdc, 0.2A), Ball bearing, 10cfm. [Digikey.com p/n P12907-ND]

A89DC-08 Firmware Update

From time to time, Obvius may release firmware updates with additional features and system changes. To find out what firmware your A89DC-08 has installed, read the firmware version register with a Modbus utility, or use the “Advanced configuration” page in the AcquiSuite setup menu. Firmware update files may be obtained from Obvius technical support.

The firmware update process requires an RS232 serial port and a windows computer to run the firmware update utility. Before starting this process, verify your computer has a serial port available. You may need to deactivate other software such as the palm pilot utility or ups monitor software. USB connected serial ports may be used, however these are not as fast or reliable as standard computer serial ports and may fail to upgrade the firmware correctly.

To update the firmware, use the following procedure.

Step 1: Install the Philips LPC2000 software as provided by Obvius.

Step 2: Remove power and DC load current from the A89DC-08. Power can be disconnected by removing the screw terminal plug from the A89DC-08 power connection socket.

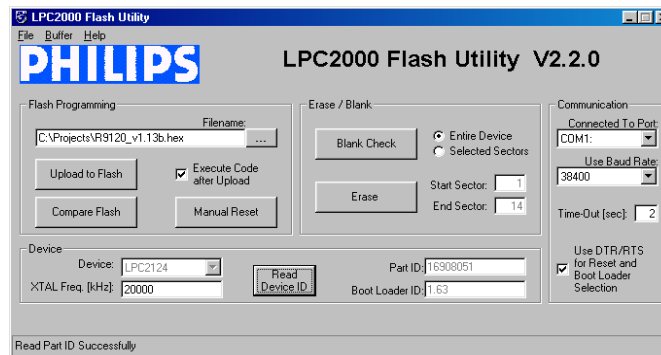


WARNING: Disconnect power and lock-out all power sources during installation. DO NOT CONNECT RS232 PORT WITH CURRENT INPUTS LIVE

Step 3: Attach the A89DC-08 to your computer with an RS232 serial cable. The A89DC-08 programming connector is the 9 pin RS232 connector on the top of the device.

Step 4: Power up the 24vdc supply to the A89DC-08. The Green Alive LED should light up and blink.

Step 5: Run the LPC2000 Flash Utility. The following screen will be displayed.



Step 6: Set the following communications options:
COM1 or COM2 depending on your computer serial port.
Use baud rate: 38400 or slower.
Check “Use DTR/RTS for Reset”
XTAL Freq[kHz] = 14745

Step 7: Click the “Read Device ID” button. The PartID and BootLoaderID fields will be shown if successful. Also, the “Device” dropdown menu should switch to LPC2131. The bottom of the window will display “Read Part ID Successfully.”

Step 8: Click the “Filename” “...” button. A dialog box will appear. Locate and select the A89DC-08 firmware image file. In the example above, this is named “A89DC-08_v1.13.hex”.

Step 9: Click the “Erase” button. This will remove the existing firmware from the A89DC-08 device.

Step 10: Click the “Upload to Flash” button. The firmware update will start, and a blue progress bar will be shown across the bottom of the screen. While the upload is in progress, the green Alive LED on the A89DC-08 will stop blinking and stay on solid.

Step 11: when the update is complete, disconnect power from the A89DC-08. Remove the RS232 serial cable.

Step 12: Re-attach the data and load wire connections. Power up the A89DC-08. The new firmware should now operate. To confirm the new firmware is installed, use the AcquiSuite device details page, click the “configure” button, and then the “Advanced” button. The firmware version number will be displayed on the lower right side of the advanced details page.