PFC Instructions
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Revision C
9/12/2005

Installation:

WARNING

INSTALLATION OF THIS CHARGER INVOLVES WORKING WITH POTENTIALLY LETHAL VOLTAGES. DO NOT INSTALL ALONE. HAVE SOMEONE NEARBY CAPABLE OF RENDERING AID. DO NOT ATTEMPT INSTALLATION UNLESS YOU HAVE TRAINING AND EXPERIENCE WORKING WITH POTENTIALLY LETHAL VOLTAGES.

WARNING

IF THE SYSTEM IS MISWIRED, THERE WILL BE SPARKS OR ARCS WHICH CAN IGNITE FLAMABLE GASSES. PERFORM THIS INSTALLATION IN A LOCATION WHERE THE AIR IS NOT FLAMMABLE.

Mechanical mounting.

Install the charger in a well ventilated but dry location. The power you get out of the charger is inversely related to the temperature. A cooler charger makes more power.

If the charger is being mounted on a vertical surface, installing the fans at the bottom of the charger will make it run cooler and make more power. It can be mounted in any orientation although with slightly reduced power output.

Bolt the charger down through the bolt holes in the flanges.

Mounting the charger so you can easily see the LEDs and turn the knob makes it easier to operate and monitor.

DC cable connection:

WARNING:

THE FOLLOWING STEP WILL EXPOSE THE INSTALLER TO POTENTIALLY LETHAL VOLTAGES. DO NOT INSTALL ALONE. HAVE SOMEONE NEARBY CAPABLE OF RENDERING AID. DO NOT ATTEMPT INSTALLATION UNLESS YOU HAVE TRAINING AND EXPERIENCE WORKING WITH POTENTIALLY LETHAL VOLTAGES.

FOR SAFETY: Disconnect the battery pack in a convenient location in the middle of the pack.

The output cable exits the box on the lower corner of the below the blue control panel as shown below.

FIRURE 2

DC cable color code:
GREEN is Chassis Ground
White is battery positive
Black is battery negative

PFC-20 and PFC-30 are terminated in an Anderson SB50 connector (50 Amp Gray, EVParts P/N CN9510, http://www.evparts.com/shopping/product_details.php?id=184&product_id=1616)

Use of a mating SB50 is not required but makes installation easier and safer.

If you have a current shunt in the negative lead, connect the negative terminal of the SB50 to the end of the shunt not connected to the battery pack.

Connect the positive terminal of the SB50 to the positive terminal of the battery pack.

Connect the green lead of the charge cable to the chassis of the vehicle.

Measure the voltage across the battery pack SB50 before connecting it to the charger SB50.

CAUTION:

IF THE SB50 IS INSTALLED BACKWARDS, DO NOT RECONNECT THE BATTERY PACK. SOMETHING WILL BE DESTROYED IN EITHER THE CAR OR THE CHARGER. THE CHARGER WARRANTEE DOES NOT COVER THIS INSTALLATION ERROR. REPAIR THE FAULT BEFORE PROCEDING.

When you car confident, the battery pack SB50 is connected properly, mate the connectors. There will be a small spark when they mate.

Cover all your connections to prevent inadvertent contact with the live wires.

AC cable connection:

Disconnect the power at the source before connecting the charger to AC power.

The input cable enters the box on the left side of the air exhaust and below the blue control panel.

FIGURE 1

AC cable color code:
GREEN is Safety Ground
White is line power (neutral on 110)
Black is line power

Connect the black and white wires to the hot terminals of the power source. If the charger is connected to 110 volts, the white wire should be connected to neutral and the black wire connected to the hot wire. Polarity is irrelevant to the charger but the next guy to work on it expects the white wire to be neutral.

Connect the green wire to safety ground from the source.

Cover your connections to prevent inadvertent contact.

Configuration

The following procedure assumes that all the batteries in the battery pack are fully charged. If the batteries in the pack are not equally charged, charge each of them individually before starting this procedure.

If you batteries are not fully charged, you may proceed with this process, but it will take a lot longer to get the charger set properly.

Read the charging recommendations for your battery. Multiply the acceptance or charging voltage by the number of batteries you have in your pack to get the target pack voltage. Example: 14.4 volts per battery times 10 batteries is 144 volts.

Connect a voltmeter to read the battery pack voltage. This may be part of the vehicle's regular instrumentation (such as an eMeter).

Connect an ammeter to read charge current. This may be part of the vehicle's regular instrumentation.

FIGURE 3

Turn the current control knob to zero (fully counterclockwise.)

Connect the AC power source.

Turn on the AC circuit breaker.

The power LED and the current limit LED should come on.

Voltage Control (VR4)

CAUTION:

THIS CONTROL IS SET BY THE INSTALLER DURING SETUP AND WILL DETERMINE THE ACCEPTANCE VOLTAGE OF THE CHARGER. THE CONTROL HAS AN EXTREMELY WIDE RANGE AND CAN BE SET SO HIGH THAT THE BATTERY PACK CAN BE DESTROYED

WITHIN A FEW HOURS. THE CHARGER MANUFACTURER CANNOT BE HELD RESPONSIBLE FOR SETUP ERRORS AND DAMAGED BATTERY PACKS. THESE SETUP STEPS ARE CRITICAL TO THE OPERATION OF THE CHARGER.

If the voltage limit LED comes on, the voltage control (VR4) is set too low. Turn the voltage control (VR4) up until the voltage limit LED turns off.

Turn the current control (VR3) to 20% of its range.

Monitor the voltmeter and ammeter. If the meters increase, you are charging the battery. A 20% setting on the current control should produce approximately 1 to 5 amps of battery charge current.

FIGURE 4

If the voltage limit LED comes on and the pack voltage is above the target pack voltage, turn the voltage control down until the target voltage is indicated.

If the voltage limit LED comes on and the pack voltage is below the target pack voltage, turn the voltage control up slightly and wait for the voltage limit LED to come back on.

When the pack voltage is at the target voltage and the voltage limit LED is on and the battery current is less than one amp, then this control is properly set. NOTE: If you started with a discharged pack, you may be waiting hours for this condition to be met.

Note: The voltage control (VR4) is a 20 turn trim pot. The pack voltage will increase approximately 20 volts per turn on the trim pot.

Charger time out

The charger has a timer that turns off the charger after a specified period of time.

SW3 controls what event will start the timer:
SW3-1 will start the timer when the acceptance voltage causes the charger to back off on current.
SW3-2 will start the timer when power is applied to the charger
SW3-3 will start the timer when the Regbus tells the charger to back off on current.

FIGURE 5

If SW3-2 is set, it will take precedence over the other two timers.

If no Batregs are connected to the charger, SW3-1 will have no effect.

If none of these three switches are closed, the charger will not turn off. It will taper back but never shut off.

SW2 is a rotary switch that controls the length of the time out. Each number is worth 10 minutes. 1 is the shortest time out period and F is the longest time out period. There is a small arrow on the control shaft next to the screwdriver slot. The zero position is at three O'clock (to the right). Four is straight down. Eight is to the left. C is at the top. DO NOT use the zero position.

When the time out circuit is not activated, the BLUE LED is off. When the time out circuit is activated, the BLUE LED blinks. As the end of the time out period approaches, the blink rate increases. When the time out has expired, the BLUE LED stays on to indicate the charger is timed out.

Batreg interface

Turning SW3-5 on and SW3-6 off will put the regulators in their normal mode of operation.
Turning SW3-6 on and SW3-5 off will put the regulators in their equalize mode of operation.

If both switches are turned on, the system will think there is an undervoltage condition and the regulator voltage limit is increased 10% from its normal setting.

In normal mode, if a regulator senses an undervoltage condition during discharge, optocouplers 1 and 2 will be activated to indicate the condition while it is happening. The red LED on the regulators will stay on to indicate which battery had the problem.

In equalize mode, the undervoltage indicator is disabled and the regulator voltage limit is increased 10% from its normal setting.

In digital feedback mode, if any regulator reaches thermal shutdown temperature, it will shut OFF the charger current until the regulator cools.

SW3-4 controls the timer behavior in the presence of batregs. When a batreg is activated, the timer starts running. If the reg turns back off and the switch is open, the timer continues to run. If the switch is closed, the timer will restart.

DIP switch function summary

1 enables the timer when acceptance voltage is reached.
2 enables the timer when the charger is turned on.
3 enables the timer when the Regbus is regulating
4 enables the timer latch after the first reg hits thermal limit
5 enables the optocoupler low voltage outputs
6 enables the equalize mode on the regs
7 enables instant shutdown (timer runs for zero time)
8 enables standby exit when a low battery voltage is sensed

Rotary switch time summary

0-undefined
1-10 minutes
2-20 minutes
3-30 minutes
4-40 minutes
5-50 minutes
6-60 minutes
7-70 minutes
8-80 minutes
9-90 minutes
A-100 minutes
B-110 minutes
C-120 minutes
D-130 minutes
E-140 minutes
F-150 minutes