

XS VOLT

DENSO ALTERNATORS

The XSvolt alternators have a state of the art voltage control system that offers a combination of features and options never before available.

PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLING YOUR NEW ALTERNATOR.



GENERAL INSTRUCTIONS

***THIS IS A "ONE WIRE" ALTERNATOR, SO THE BATTERY CHARGE WIRE IS THE ONLY CONNECTION REQUIRED FOR STANDARD ALTERNATOR OPERATION. XS VOLT UNITS COME FACTORY SET AT 14.9V FOR STANDARD USE.**

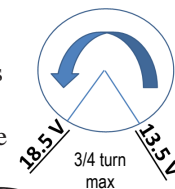
Original vehicle wiring- The import style round factory plug and harness should **NOT** be plugged into the Denso style XSvolt alternator.

HIGHER VOLTAGE CANNOT COMPENSATE FOR TOO SMALL AN ALTERNATOR- The voltage level of the XSvolt system can only be maintained if the alternator is operating at or below its amperage capability. If the vehicle's amperage load is greater than the alternator's capability, then the supplemental amperage will have to be supplied by the battery, which will cause voltage to fall. Once this situation has occurred, increasing the alternator's voltage set point will not remedy the low voltage.

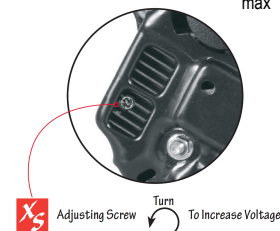
EXCESSIVE VOLTAGE CAN DAMAGE ELECTRICAL COMPONENTS- Increasing the voltage level beyond typical levels can increase certain electrical component performance, but excessively high voltage can be damaging. Refer to the component owner's manual or contact the manufacturer to determine the maximum voltage for safe operation of all aftermarket electrical components. **For all original equipment components, voltage should not be allowed to exceed 15.2 volts. Powermaster is not responsible for damage resulting from voltage levels exceeding component manufacturer's recommendations.**

OPTIONAL FEATURES [The following options are available, but their activation is not required]

Adjustable voltage set point- This feature allows the end user to adjust the voltage level that the alternator sees as its ultimate goal. This is accomplished by turning the small white potentiometer located in the **Heat sink** on the rear of the alternator. Make adjustments with a small Philips or flat screwdriver, taking care not to rotate the potentiometer beyond its physical limitations. The approximate adjustable range is 13.5V through 18.5V and increases with **counter clockwise** rotation.

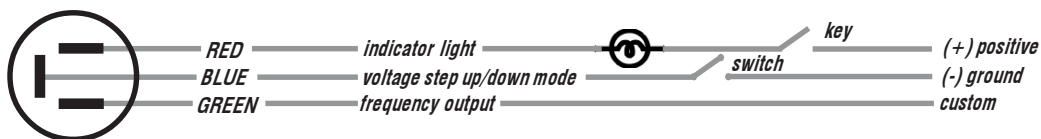


To adjust, first, **TURN OFF** all nonessential vehicle accessories. Next, confirm the battery is in a charged state by using a hand-held digital voltmeter to test voltage at the battery terminals (12.4V+ if 12 volt system/16.5V+ if 16 volt system). **Start the vehicle** and adjust system voltage (measured at the battery) to the desired level. After the adjustment is set, bring the engine to a fast idle while monitoring the voltage, if voltage increases, readjust to desired voltage level while maintaining a fast idle. (see page 2 for additional instructions and precautions)



WARNING: MAKE ADJUSTMENTS WITH ALL NONESSENTIAL VEHICLE ACCESSORIES OFF. ADJUSTING VOLTAGE WITH AMPLIFIERS, LIGHTS, OR OTHER HIGH AMPERAGE ACCESSORIES ON CAN RESULT IN DANGEROUSLY HIGH VOLTAGE WHEN ACCESSORIES ARE THEN SWITCHED OFF.

NOTE: Activating secondary optional features requires Denso style XSvolt plug/harness P/N 129. Before inserting, remove plastic cover on rear of alternator.



INDICATOR LIGHT- This is an output for a NO CHARGE indicator light. When this feature is utilized, a light will be illuminated when the key is in the run position and the alternator is not charging. The light will not illuminate when the engine is running and the alternator is charging.

To activate this feature, connect the red wire on the XSvolt plug/harness to one side of a 250mA bulb (a typical dash light) and connect the other side to a switched **positive (+)** source that is on when the ignition key is in the run position.

VOLTAGE STEP UP/DOWN MODE- This feature can be used to remotely step the voltage set point up or down 1.25V from the previously adjusted setting.

To use as a step up mode: Normally ground the blue wire on the XSvolt plug/harness and use a switch to remove the ground when a 1.25V step up is desired.

To use as a step down mode: Leave the blue wire normally open. Use a switch to apply ground to the blue wire when a 1.25V step down is desired. (see page 2 for additional instructions and applications)

FREQUENCY OUTPUT- On the Denso style units, this is a 5 volt digital square wave output, which could be used in custom applications to monitor the alternator.



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INSTRUCTIONS (CONT'D)

PAGE 2



APPLICATIONS

CIRCLE TRACK RACING APPLICATIONS -- The XSvolt alternator can be setup to create a *Power Saving Mode*. This mode allows the alternator's normal charging to be temporarily reduced to reclaim as much as 50% of the alternator's horsepower requirements. Suggested times for use would include: when qualifying, in straight-aways, and the sprint for the checkered flag at the end of the race. The mode can be triggered with a full throttle activated momentary switch, a dash mounted toggle, or by any other innovative means. To do this, simply ground the blue wire from the XSvolt harness through the inline ON/OFF switch. With the switch in the OFF position (not grounded), adjust the voltage (as directed on page 1) to the preferred battery charge voltage. When the switch is in the ON position (grounded), the voltage will drop 1.25V from its previously set level.

NOTE: Activating secondary optional features requires XSvolt plug/harness P/N 129



DRAG RACING APPLICATIONS -- The XSvolt alternator can be setup to offer a *High Voltage Quick Recharge Mode*. This mode allows the alternator's normal charge rate to be temporarily boosted to prioritize charging when horsepower is in abundance while in the pits, during staging, and on the return slip. The mode can be triggered with a full throttle activated momentary switch, a dash mounted toggle, or by any other innovative means. To do this, simply ground the blue wire from the XSvolt harness through the inline ON/OFF switch. With the switch in the ON position (grounded), adjust the voltage (as directed on page 1) to optimal voltage desired during the pass. *Keep in mind that higher voltage levels maximize your electronics' performance, while lower voltage settings minimize horsepower requirements from the engine.* When the switch is in the OFF position (not grounded), the voltage will increase 1.25V from its previously set level. Make certain that the highest setting is within safe limits for electronics and the battery.

NOTE: Activating secondary optional features requires XSvolt plug/harness P/N 129



HIGH AMP/ SPL APPLICATIONS -- The XSvolt alternator can be configured to optimize daily driving voltage, as well as to maximize performance voltage for high amp situations.

Ground the blue wire from the XSvolt harness through an inline ON/OFF switch mounted on the dash. With the switch in the ON position (grounded), adjust the voltage (as directed on page 1) to the preferred *daily driving* level. Next, move the switch to the OFF position (not grounded) and test the voltage at the battery. The resulting voltage should be approximately 1.25V higher than previously tested. Make certain that the highest setting is within safe limits.

NOTE: Activating secondary optional features requires XSvolt plug/harness P/N 129



NOTE:

* The above voltage settings will only affect voltage if the alternator is at or below its amperage capabilities. If the amperage requirements become greater than the alternator's capabilities, system voltage will fall. The XSvolt alternator will then automatically maximize its output voltage to compensate, overriding the current voltage set point, until system voltage has once again risen to the preset voltage level.

* *The XSvolt alternator will turn itself off when the engine stops. Regardless of which features are activated through the XSvolt plug/harness, there will be no residual draw on the battery after the engine is off.*

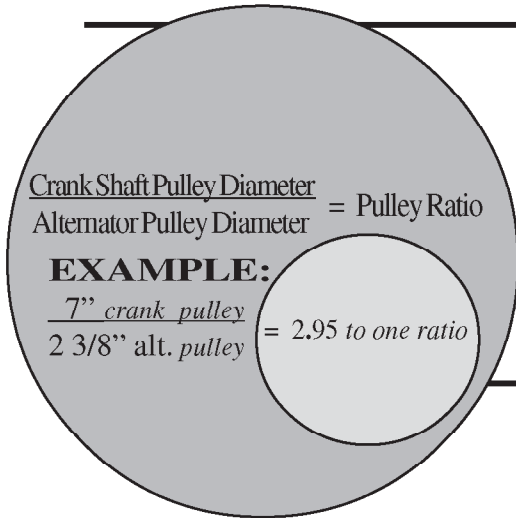
Different battery types prefer different charge rates -- Battery life and performance can be extended if the alternator is adjusted to provide the optimal battery charge voltage measured at the battery. Check with your battery's manufacturer for their recommendations. Battery manufacturers can also supply the maximum safe charge voltages for their batteries, allowing voltage levels to be temporarily boosted to improve electronic components' performance.



WARNING



This alternator should not be allowed to exceed 18000 RPMs at any time. Alternator components are not designed to withstand the increased stress resulting from excessive RPMs. Powermaster recommends that you calculate your pulley ratio and multiply it times your highest expected engine RPM to determine if your alternator will operate within the acceptable range.



To calculate a vehicle's pulley ratio, the engine's crank pulley diameter should be divided by the alternator's pulley diameter. This ratio should then be multiplied times the highest expected engine RPMs. The result will be that vehicle's maximum alternator RPM.

$$(\text{Pulley Ratio}) \times (\text{Max. Engine RPM}) = \text{Max. Alternator RPM}$$

$$2.95 \times 6000 \text{ max. rpm} = 17700 \text{ max. alternator rpm}$$

If your situation allows for greater than 18000 alternator RPMs, Powermaster recommends increasing the alternator pulley diameter or decreasing the crank pulley diameter to compensate. Powermaster has various pulleys available to help. If pulley ratio compensation is not an option, installing a rev limiter on the engine is recommended.

Excessive RPMs can cause the alternator fan to flex and contact the drive belt. This could cause property damage and/or personal injury. In addition to RPMs, there are other factors that will substantially increase the likelihood of alternator fan-to-belt contact.

- ALTERNATOR BRACKET ALIGNMENT AND STABILITY:**
Alternator brackets can be misaligned in such a way that the clearance between the alternator fan and belt is reduced. Loose or nonrigid brackets can also increase the likelihood of contact.
- WORN OR LOOSE BELTS:**
Belts that allow for side-to-side movement or deflection will decrease the effective gap between the fan and belt and increase the likelihood of contact.
- IMPROPER BELTS:**
Powermaster supplied V-type pulleys are designed to accommodate up to a 10mm or 3/8" belt. Larger belts will not seat into the pulley groove properly and will increase the likelihood of belt-to-fan contact. If the application requires a belt of greater than 10mm or 3/8" width, Powermaster recommends the original equipment pulley be used instead of the supplied pulley.



NOTE: Powermaster is not responsible for vehicle damage or any other damage resulting from improper use of this product.

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WIRE! RIGHT!

The Powermaster Cables are made up of hundreds and even thousands of strands of **pure copper** wire. This ensures that more current can be transferred efficiently with less heat build-up and loss.

The cables meet American Wire Gauge specs and are **made in the USA** and are finished with machine crimped ring lug terminals.

- *Fine strands of pure, oxygen-free copper wire*
- *Extremely flexible for easy routing*
- *Durable sleeve designed for underhood environments*
- *Available in 0-8 gauge diameters from 1-12 feet lengths*
- *Hydraulically terminated eyelet terminals*

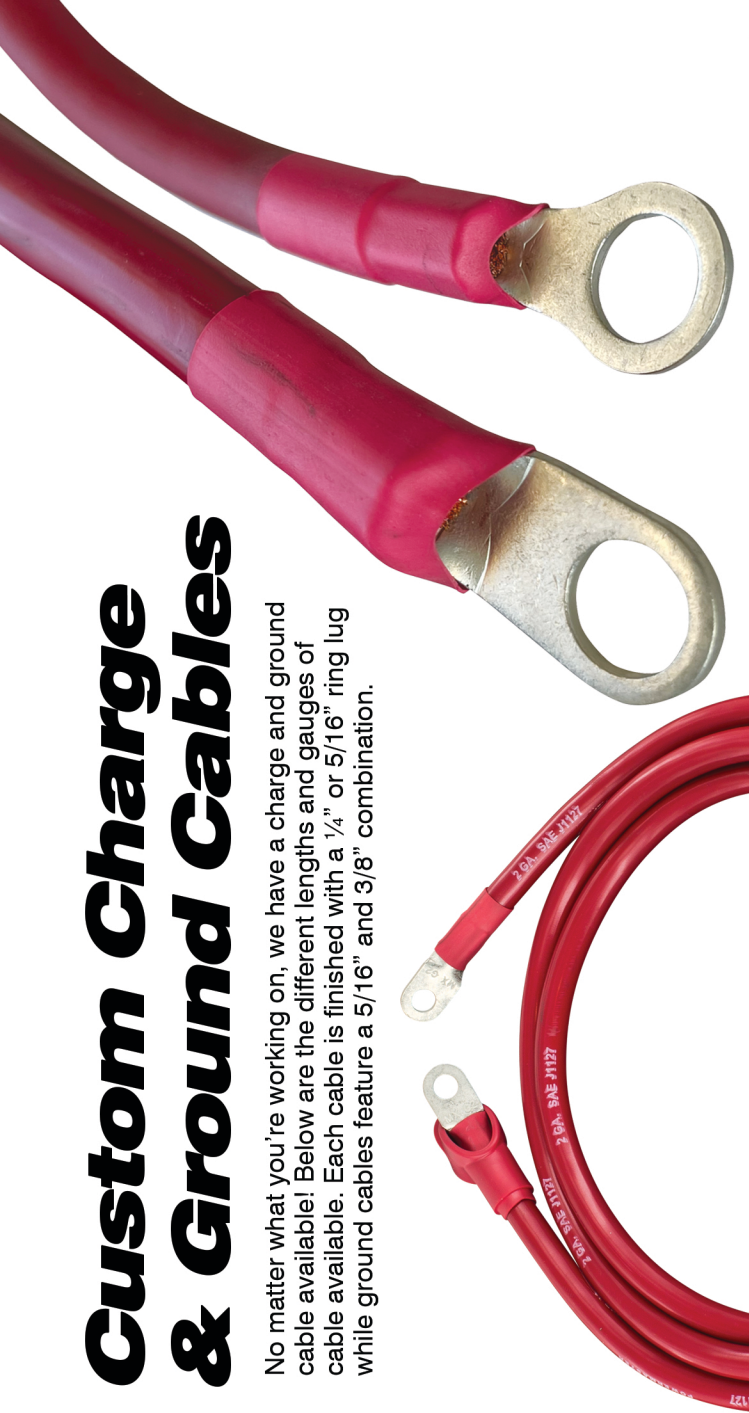
630-957-4019 OR

TECH@POWERMASTERPERFORMANCE.COM



Custom Charge & Ground Cables

No matter what you're working on, we have a charge and ground cable available! Below are the different lengths and gauges of cable available. Each cable is finished with a 1/4" or 5/16" ring lug while ground cables feature a 5/16" and 3/8" combination.



Red Charge Wire	1'	2'	3'	4'	5'	6'	7'	8'	10'	12'
8-Gauge, 1/4" and 5/16" Terminals Installed		1-582-130	1-583-130	1-584-130	1-585-130	1-586-130	1-587-130	1-588-130		
6-Gauge, 1/4" and 5/16" Terminals Installed		1-562-130	1-563-130	1-564-130	1-565-130	1-566-130	1-567-130	1-568-130	1-5610-130	1-5412-130
4-Gauge, 1/4" and 5/16" Terminals Installed		1-542-130	1-543-130	1-544-130	1-545-130	1-546-130	1-547-130	1-548-130	1-5410-130	1-5412-130
2-Gauge, 1/4" and 5/16" Terminals Installed		1-522-130	1-523-130	1-524-130	1-525-130	1-526-130	1-527-130	1-528-130	1-5210-130	1-5212-130
0-Gauge, 1/4" and 5/16" Terminals Installed		1-502-130	1-503-130	1-504-130	1-505-130	1-506-130	1-507-130	1-508-130	1-5010-130	1-5012-130
8-Gauge, 5/16" Terminals on both ends Installed		1-582	1-583	1-584	1-585	1-586	1-587	1-588		
6-Gauge, 5/16" Terminals on both ends Installed		1-562	1-563	1-564	1-565	1-566	1-567	1-568	1-5610	
4-Gauge, 5/16" Terminals on both ends Installed		1-542	1-543	1-544	1-545	1-546	1-547	1-548	1-5410	1-5412
2-Gauge, 5/16" Terminals on both ends Installed		1-522	1-523	1-524	1-525	1-526	1-527	1-528	1-5210	1-5212
0-Gauge, 5/16" Terminals on both ends Installed		1-502	1-503	1-504	1-505	1-506	1-507	1-508	1-5010	1-5012
Black Ground Wire	1'	2'	3'							
8-Gauge, 5/16" and 3/8" Terminals Installed	1-781	1-782	1-783							
6-Gauge, 5/16" and 3/8" Terminals Installed	1-761	1-762	1-763							
4-Gauge, 5/16" and 3/8" Terminals Installed	1-741	1-742	1-743							
2-Gauge, 5/16" and 3/8" Terminals Installed	1-721	1-722	1-723							
0-Gauge, 5/16" and 3/8" Terminals Installed	1-701	1-702	1-703							
Ground Strap	1'									
Ground Strap, 1" wide, 1' long, 5/16" and 3/8" Terminal Installed	1-711									
		CHARGE WIRE LENGTH								
AMP LOAD	1'-6"	7'-13"	14'-20"							
50-100	8g	6g	4g							
100-150	6g	4g	2g							
150-220	4g	2g	0g							
220+	2g	0g	1/0g							

! WARNING: Cancer or Reproductive Harm
www.P65warnings.ca.gov