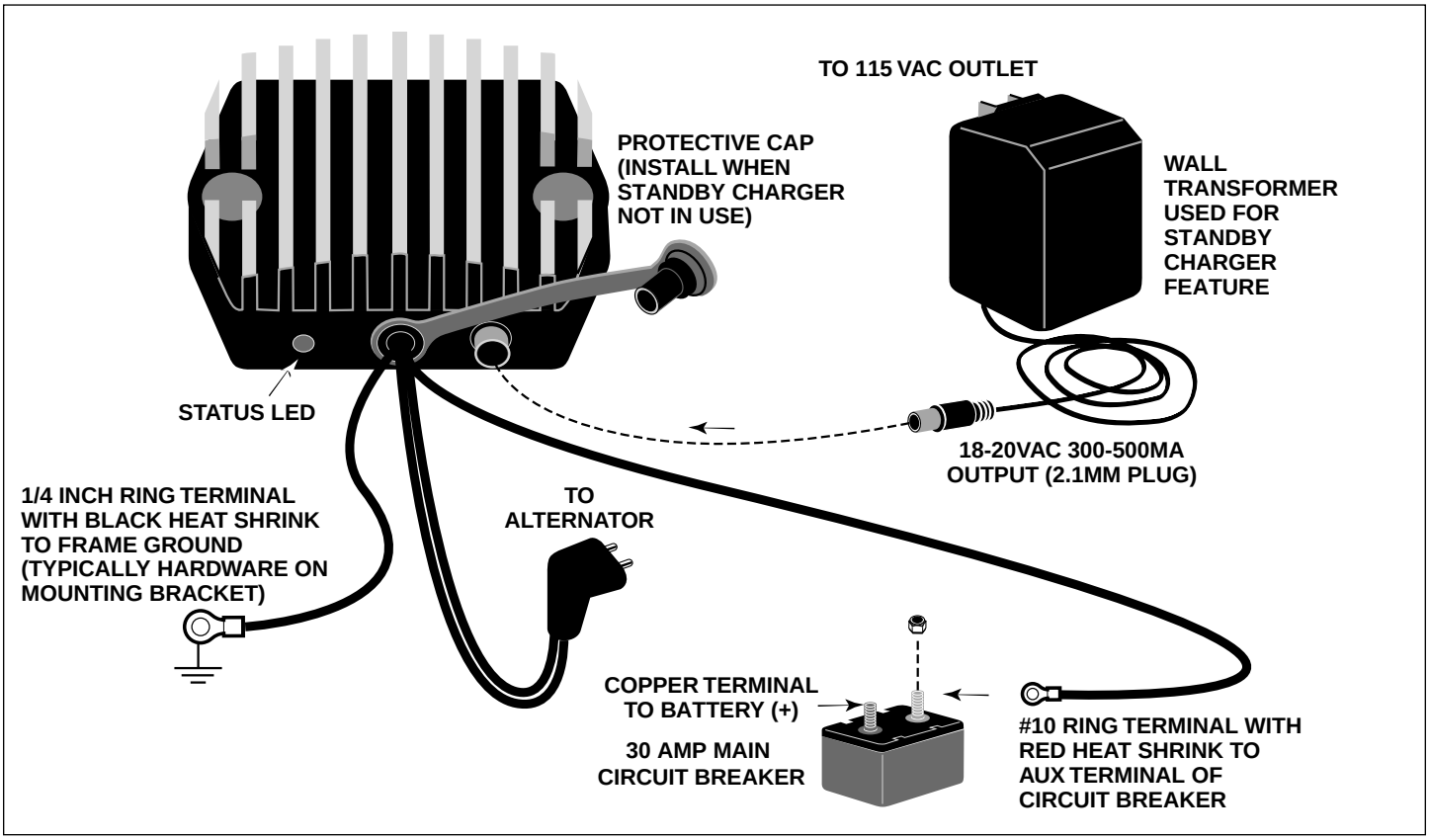
FireBall™

INSTALLATION INSTRUCTIONS for MOTORCYCLE VOLTAGE REGULATOR WITH CHARGER

Part Numbers 8-4050 through 8-4053

CAUTION: READ INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION



INTRODUCTION

Crane Fireball Motorcycle Voltage Regulators are plug-in replacements for the stock regulators. Compared to the stock regulators, the Crane regulators offer many additional features, including a built-in standby charger that eliminates the need for a separate regulator and charger.

WARNING: For use with 32 amp or less alternator and 30 amp circuit breaker only. Use with higher output alternator will damage the regulator and void the warranty. Use wall transformer for standby charger with North American 115 volt, 60 Hz AC line only.

WARNING: Install protective cap on regulator when running motorcycle or standby charger is not in use. Otherwise moisture and dirt intrusion may cause damage to the regulator and void the warranty.

CAUTION: Standby charger will not recharge a dead battery. If battery is fully discharged, connect to a 2 amp charger for approximately 2 hours before connecting standby charger.

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FEATURES

The FireBall Voltage Regulator provides a combination of features not found in any other competitive unit:

- **Increased Performance**. Most H-D® original equipment and aftermarket units use "shunt" regulation technology. When the battery is sufficiently charged or the engine is running at high RPM, shunt regulators place a dead short across the alternator. A large current circulates through the alternator and regulator. This short circuit current places a substantial load on the engine and causes significant heat dissipation in the alternator windings and within the regulator. At high RPM, the losses caused by shunt regulation can approach one horsepower. Under cruising conditions, oil temperature increases and fuel economy suffers.

  The FireBall unit uses series regulation technology. An electronic switch inside the unit disconnects the alternator when the battery is charged or the engine is running at high RPM. No current flows under these conditions. Consequently, the engine does not see any load. Benefits include reduced power losses and heat dissipation. Available horsepower and fuel economy are both increased.

- **Extended Battery Life**. Conventional battery tenders run a trickle charge current through the battery or apply a constant "float voltage." Newer units switch from trickle to float charge. Trickle charging can cause the battery electrolyte to completely boil off within a few days. Float charging with a constant voltage also causes problems. At low ambient temperatures, the voltage tends to be too high, causing excessive current and rapid electrolyte boil-off. At higher temperatures, the voltage tends to be too low, causing the battery to slowly discharge and allowing harmful sulfate deposits to form. Battery life rarely exceeds one year.

  The FireBall unit uses a RISC microcontroller (same as in our HI-4 ignitions) and a temperature sensor IC to monitor the battery. An LED shows battery status. During storage, power is supplied from a 115VAC plug-in wall transformer. When the battery drops below 100% charge voltage (corrected for ambient temperature), the smart charger pulses current through the battery. Since the battery is only occasionally pulsed, electrolyte boil-off is almost eliminated. Since the battery is always maintained at 100% charge, sulfation is greatly reduced. Useful battery life is extended by several years.

PRE-INSTALLATION INSPECTION

If there is a fault in the charging system, determine the cause before proceeding.

Once the cause is determined, replace the defective components and follow the steps below:

1. Examine the existing regulator for signs of corrosion around the mounting hardware and if so, clean ground connections thoroughly and verify continuity between these ground connections and the battery (-) terminal.
2. Trace wires from existing regulator to determine any trim that may have to be removed to gain access.

INSTALLATION FOR BIG TWIN® AND 1981 THRU 1992 SPORTSTER® MODELS

WARNING: 95 and later FLT models with high output alternator (38 amp or greater) are not compatible with any Crane Voltage Regulators.

WARNING: Disconnect the battery ground wire (at negative terminal) before making any electrical connections.

Refer to the figure on page 1. The connectors may differ in appearance, but all installations follow the procedures below:

1. Disconnect the existing regulator from the alternator connector.
2. Remove any trim to gain access to the wire routing path and battery circuit breaker.
3. Disconnect the wires from battery circuit breaker and remove it for inspection. If the circuit breaker is corroded or cracked, it should be replaced.
4. Apply dielectric grease to the terminals of the circuit breaker. Route the red heat shrink wire from the Crane regulator to the AUX side of the circuit breaker (steel terminal). Verify that the wire will not interfere with any controls or moving parts and cannot contact any hot surfaces.
5. Reinstall the circuit breaker and attach the wire that leads to the battery (+) terminal to the copper terminal of the circuit breaker.
6. Locate a suitable ground point for the Crane regulator. You can use one of the mounting bolts. Connect the black heat shrink wire to ground.
7. Install the mounting hardware on the regulator and bracket and tighten.

8. Secure wires in place with wire ties, paying particular attention to avoid controls, moving parts, and hot surfaces. Excess wire should be looped and secured in a convenient location behind a cover or out of plain view.

INSTALLATION FOR 92 AND UP SPORTSTER® MODELS

WARNING: Disconnect the battery ground wire (at negative terminal) before making any electrical connections.

1. Disconnect the existing regulator from the alternator connector.
2. Disconnect the single pin terminal from the main circuit breaker. Leave this wire to the main circuit in place, as it will be used again.
3. Inspect the wires from battery circuit breaker. If the circuit breaker is corroded or cracked, it should be replaced.
4. Cut the red heat shrink wire on the Crane Regulator to the same length as the wire with the single pin connector on the old regulator.
5. Strip the insulation back 1/4 inch and crimp the terminal using a proper crimp tool such as NAPA P/N 726603. Alternately, needle-nose pliers followed by soldering can be used to secure the crimp. Insert the crimped terminal into the connector until it locks in place.
6. Locate a suitable ground point for the Crane regulator. You can use one of the mounting bolts. Connect the black heat shrink wire to ground.
7. Install the mounting hardware on the regulator and bracket and tighten.
8. Secure wires in place with wire ties, paying particular attention to avoid controls, moving parts, and hot surfaces. Excess wire should be looped and secured in a convenient location behind a cover or out of plain view.

OPERATION

The status LED will indicate the state of the charging system when the engine is running or the standby charger is operating.

- **LED continually o**n indicates battery is at full charge.
- **LED blinking** indicates system is recharging the battery.
- **LED off** indicates a problem with the charging system. Consult the troubleshooting section.

Charging voltage should be about 13.5 volts when the motorcycle is running. A fully charged battery should read 12.8 volts at 70 °F when the standby charger has been operating for several hours.

When the motorcycle is running, the LED may transition between blinking and being on. This will give the appearance of a slow blink rate, but does not indicate a problem with the charging system.

For standby charging, plug the wall transformer into any standard 115 VAC outlet. Plug the cable from the wall transformer into the jack on the voltage regulator. The standby charger can be left connected indefinitely since it only charges when necessary to maintain the battery at an optimum voltage. This allows the motorcycle to be stored for extended periods without the need to remove the battery.

TROUBLESHOOTING

Consult the service manual if there are any problems with the charging system prior to installation of the new Crane regulator.

If a problem occurs after installation of the Crane regulator, follow the procedures outlined below.

Did the charging system function properly before installation of the Crane regulator? If not, reinstall the original equipment regulator or a known good regulator and correct the original problem. If the Crane regulator functioned properly prior to the problem, perform the following steps:

1. Test continuity from battery (-) terminal to the regulator ground.
2. Verify the alternator connector is fully seated and secure.
3. Remove cables from the battery (-) terminal and test the resistance of the circuit breaker between the regulator wire and battery (+) terminal. The resistance should be close to zero.
4. Test the battery. If a battery cell has gone bad, the regulator will not operate properly.

Does the Crane regulator work when the motorcycle is running but not when operating in the standby mode? If so, perform the following steps:

1. Test the 115 VAC outlet to determine if it is “hot”.
2. Test the output of wall transformer at the inner and outer sleeves of the power plug. The output should be 20 VAC.
3. Verify the charger plug is fully seated in the regulator connector.

Does the Crane regulator work in the standby mode but not when the motorcycle is running? If so, perform the following steps:

1. Verify the alternator connector is fully seated and secure.
2. Consult your motorcycle's service manual to test the alternator.

For other charging system questions, consult your motorcycle's service manual. For questions concerning the Crane regulator, call the Crane Tech Line listed at the bottom of page 1.