

CHARGING SYSTEM

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
EXTECH INDUCTIVE AMMETER	380941	2
NAPA ULTRA PRO BATTERY LOAD TESTER	95260	2–4

GENERAL

SYSTEM DESCRIPTION

The purpose of the charging system is to keep the battery at a full state of charge.

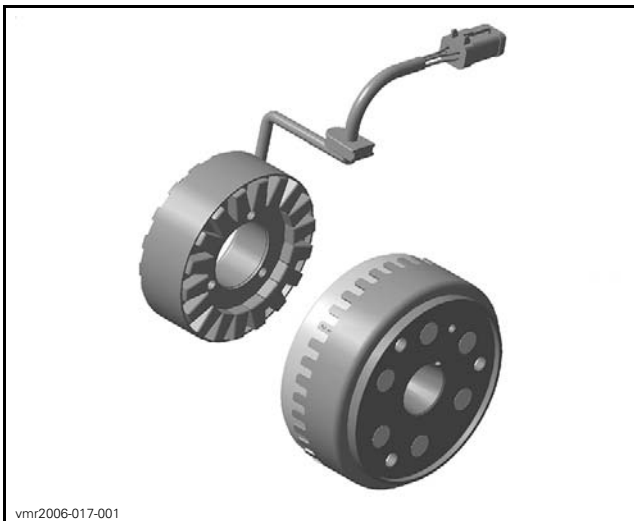
NOTE: For an overview of the vehicle electrical system, refer to *ENGINE MANAGEMENT SYSTEM* section.

Magneto

The magneto is the primary source of electrical energy. It transforms a magnetic field into electric current (AC).

The alternating current is regulated and transformed into direct current (DC) by the voltage regulator, and normally powers all of the vehicle's systems and accessories.

The magneto has a 3 phase delta wound stator.



TYPICAL

Voltage Regulator

The regulator receives AC current from the magneto and transforms it into direct current (DC).

The voltage regulator output voltage is distributed as follows:

- Fuse links
- Battery.

The voltage regulator limits voltage to prevent any damage to electrical components.

COMPONENT	VOLTAGE Vdc
Voltage Regulator	Minimum 12.5
	Maximum 15



TYPICAL

Battery

The battery supplies DC power to every electrical and electronic system in the vehicle as well as all accessories. At low engine RPM operation and high current load conditions, it supplements the magneto's output as required, and helps to maintain a steady system voltage.

TROUBLESHOOTING

It is good practice to check for fault codes using the B.U.D.S. software as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Subsection 04 (CHARGING SYSTEM)

BATTERY REGULARLY DISCHARGED OR WEAK

- 1. Loose or corroded battery cable connections.
- Tighten or repair battery cable connections.
- 2. Worn or defective battery.
- Charge and test battery.
- 3. Defective magneto stator.
- Test stator, refer to MAGNETO AND STARTER SYSTEM subsection.
- 4. Defective regulator/rectifier.
- Test system voltage.
- 5. Damaged magneto rotor or Woodruff key.
- Replace magneto rotor or Woodruff key, refer to MAGNETO AND STARTER SYSTEM subsection.

PROCEDURES

Ensure battery is fully charged.
Refer to *WIRING HARNESS AND CONNECTORS* subsection for harness layout and connector locations on vehicle.
Refer to appropriate *WIRING DIAGRAM* for additional information.
The magneto is covered in *MAGNETO AND STARTER* subsection.

**WARNING**

Ensure vehicle is in PARK when performing charging system tests.

BATTERY LOAD TEST

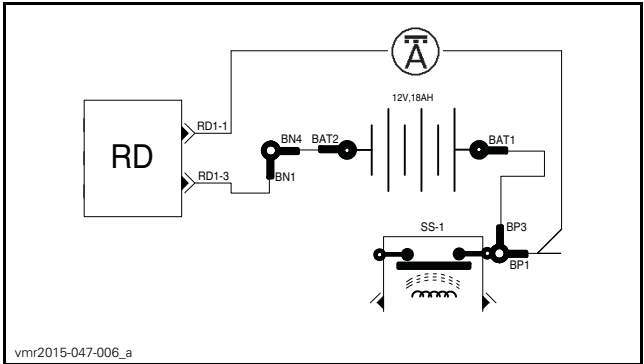
- 1. Remove seat.
- 2. Connect a battery load tester such as the NAPA ULTRA PRO BATTERY LOAD TESTER (P/N 95260).
- 3. Ensure proper test conditions.

TEST CONDITIONS	
Initial battery voltage‡	Above 12.5 Vdc
Engine	OFF
Load	3 times the amp-hour (AH) rating
Time	15 seconds
‡ Required for accurate testing	

SPECIFICATION	
Battery	Above 9.6 Vdc

If battery voltage drops below specification during test, replace battery and perform a *CHARGING SYSTEM LOAD TEST*.

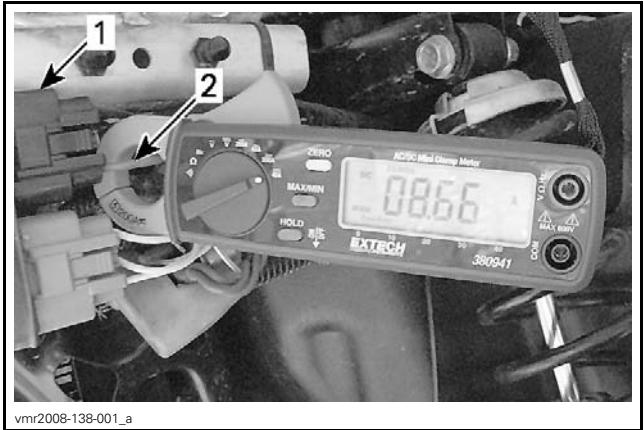
CHARGING SYSTEM LOAD TEST



- 1. Remove seat.
- 2. Connect a battery load tester such as the NAPA ULTRA PRO BATTERY LOAD TESTER (P/N 95260).
- 3. Start vehicle and read voltage on tester.

SPECIFICATION	
Voltage	12.5 - 15 Vdc

- If voltage is **above** specification, replace regulator and continue *CHARGING SYSTEM LOAD TEST*.
- 4. Connect an ammeter such as EXTECH INDUCTIVE AMMETER (P/N 380941) around RD1-1 wire.



DC CURRENT TEST WITH INDUCTIVE AMMETER
1. Output connector of voltage regulator
2. Ammeter clamped over RED wire

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM

TEST CONDITIONS	
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

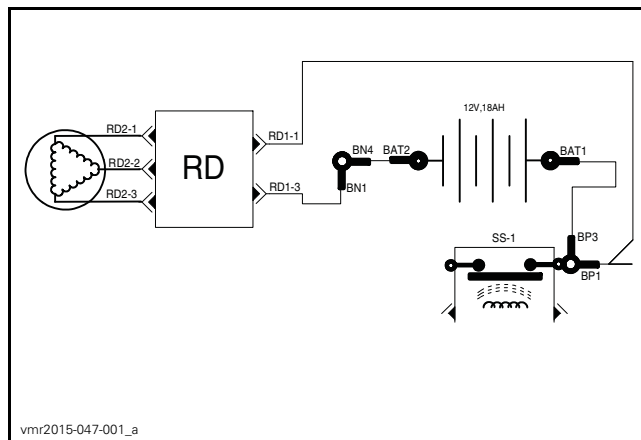
6. Read amperage on ammeter.

MODEL	SPECIFICATION
Base models (no-DPS, not CE)	35 ± 5 Amps
DPS models	41 ± 5 Amps
All CE models	41 ± 5 Amps

If amperage or voltage is not within specification, verify magneto and wires. Refer to *MAGNETO AND STARTER* subsection. Replace:

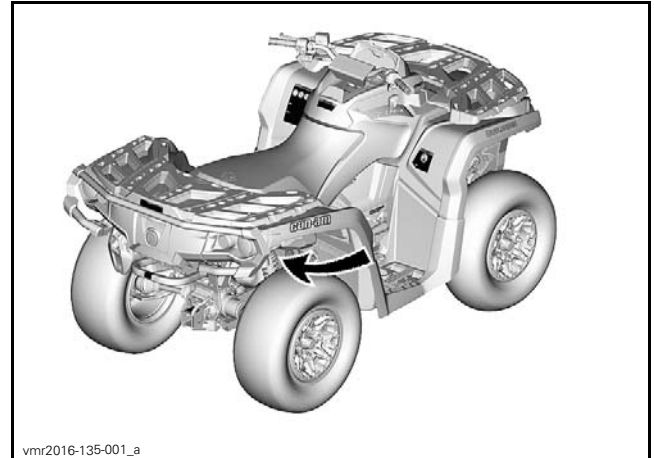
- Voltage regulator if magneto test is within specifications.
- Magneto if magneto test is not within specifications.

VOLTAGE REGULATOR (RD)



Voltage Regulator Access

The voltage regulator/rectifier is accessible on the RH rear side of the vehicle.



Voltage Regulator Continuity Test

Due to internal circuitry, there is no static test available.

Voltage Regulator Power Test

1. Check voltage at RD1-1.

TEST CONDITIONS		
RD1-1	Hot at all times	
BACKPROBE	PROBE	SPECIFICATION
RD1-1	BAT2 (-)	Battery voltage

2. Connect a battery load tester such as the NAPA ULTRA PRO BATTERY LOAD TESTER (P/N 95260).

3. Start vehicle.

4. Ensure proper test conditions.

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

5. Measure voltage drop.

BACKPROBE	PROBE	SPECIFICATION
RD1-1	BAT1 (+)	Under 0.2 Vdc

If voltage drop is above specification, locate and repair damaged connector/wire.

Voltage Regulator Ground Test

1. Check ground at RD1-3.

TEST CONDITIONS		
RD1-3		Permanent ground
BACKPROBE	PROBE	SPECIFICATION
RD1-3	BAT1 (+)	Battery voltage

- 2. Connect a battery load tester such as the NAPA ULTRA PRO BATTERY LOAD TESTER (P/N 95260).
- 3. Start vehicle.
- 4. Ensure proper test conditions.

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

- 5. Measure voltage drop.

BACKPROBE	PROBE	SPECIFICATION
RD1-3	BAT2 (-)	Under 0.4 Vdc

If voltage drop is above specification, locate and repair damaged connector/wire.

BATTERY

Battery Information

These vehicles are equipped with a VRLA battery (Valve Regulated Lead Acid). It is a maintenance-free type battery.

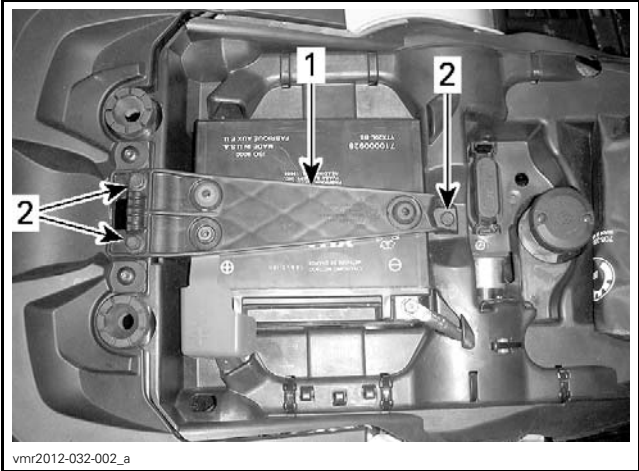
Refer to battery manufacturer's instructions for proper filling, activation and routine charging procedures.

Battery Removal

- 1. Remove seat.
- 2. Disconnect BLACK (-) cable first, then the RED (+) cable.

NOTICE Always respect this order for removal; disconnect BLACK (-) cable first.

- 3. Remove battery retaining plate.



TYPICAL
1. Battery retaining plate
2. Retaining plate screws (3)

- 4. Remove battery.

Battery Cleaning

Clean the battery support, cables and battery posts using a solution of baking soda and water.

Remove corrosion (if so) from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water and dry well.

Battery Inspection

Visually inspect battery casing for cracks or any other damages. If casing is damaged, replace battery and thoroughly clean battery support with a water and baking soda solution.

Inspect condition of battery posts, battery support, holding strap and strap attachment points and wire terminal lugs.

Battery Storage

It is not necessary to remove the battery during vehicle storage but it is recommended for long term storage.

If the battery is left in the vehicle during storage or used infrequently, disconnect the BLACK (-) negative battery cable to eliminate battery current drain from the electrical equipment.

Recharge the battery once a month with an approved battery charger as per manufacturer's recommendations.

Clean battery, battery support and connections as required, refer to BATTERY CLEANING in this section.

For other recommendations during storage, refer to battery manufacturers instructions.

⚠ WARNING

Ensure battery is stored in a safe place, out of reach for children.

TIGHTENING TORQUE

Battery retaining plate screws	4.5 N•m ± 0.5 N•m (40 lbf•in ± 4 lbf•in)
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New Battery Activation

Refer to the instructions provided with the battery.

Battery Charging

⚠ WARNING

Always wear safety glasses and charge in a well ventilated area. Never charge or boost a battery while it is installed on vehicle. Do not open the sealed cap during charging. Do not place battery near open flame.

NOTICE If battery becomes hot, stop charging and allow it to cool before continuing.

NOTE: Sealed VRLA batteries have an internal safety valve. If battery pressure increases due to overcharging, the valve opens to release excess pressure, preventing battery damage.

An automatic charger is a fast and convenient way for error-proof charging.

Always follow the battery manufacturer's charging instructions.

When using a constant current charger, charge battery according to the chart below.

Battery Voltage Below 12.8 V and Above 11.5 V

STANDARD CHARGING (RECOMMENDED)		
BATTERY TYPE	TIME	CHARGE
YTX20L-BS	4 - 9 HOURS	2 A

QUICK CHARGING		
BATTERY TYPE	TIME	CHARGE
YTX20L-BS	50 MINUTES	10 A

Battery Installation

NOTICE Always connect RED (+) cable first then BLACK (-) cable.

Installation is the reverse of removal procedure, however pay attention to the following.