

SERVICE BULLETIN



M-1020

January 24, 1992

BATTERIES

General

This Service Bulletin includes information and procedures for the following:

- **WARRANTY COVERAGE** (page 1)
- **SET-UP PROCEDURES TO ENSURE BEST PERFORMANCE** (pages 1-3)
- **MAINTENANCE PROCEDURES TO KEEP THE BATTERY RELIABLE** (pages 3-4)
- **STORAGE PROCEDURES TO PREVENT SULFATION** (page 4)
- **TESTING PROCEDURES TO DETERMINE IF THE BATTERY IS DEFECTIVE** (pages 4-8)

Warranty Coverage

WARRANTY DOES COVER

Warranty does cover defects in materials or workmanship.

1. Dead cells.
2. Open circuits.
3. Low output (fully charged battery will not pass load test).

WARRANTY DOES NOT COVER

Warranty does not cover failures due to mishandling, neglect, improper installation, or improper set-up.

1. Mishandling (cracked or damaged case).
2. Neglect. This refers to **sulfation** due to:
 - a. low electrolyte levels (caused by lack of maintenance).
 - b. vehicle inactivity.
3. Improper installation (cracked or melted posts due to improper torque on the terminals).
4. Improper set-up failures. This will cause the battery to **sulfate** more rapidly.

Dry-Charged Batteries

All original equipment and replacement batteries supplied by Harley-Davidson are dry-charged batteries that must be filled with electrolyte and given a slow charge before installation.

SAFETY IN HANDLING BATTERIES AND ELECTROLYTE

To avoid injury, observe the following warnings.

WARNING

Figure 1 illustrates the warning label located on the top or back panel of all batteries.

POISON/DANGER - CAUSES SEVERE BURNS

Contains sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: **EXTERNAL** - flush with water. **INTERNAL** - Drink large quantities water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately. **EYES** - Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN

Figure 1. Battery Warning Label

- **Never remove the above label from the battery.**
- **Always "unplug" or turn battery charger "OFF" before disconnecting charger clamps from battery. Disconnecting clamps with charger "ON" could cause a spark and a possible battery explosion. A battery explosion may rupture the battery case and spray sulfuric acid onto the surrounding area and personnel, resulting in serious injury.**

ROUTING	SERVICE MANAGER	SALES MANAGER	PARTS MANAGER	LEAD TECHNICIAN	TECHNICIAN NO.1	TECHNICIAN NO.2	TECHNICIAN NO.3	TECHNICIAN NO.4	RETURN THIS TO
INITIAL HERE									

1992 Harley-Davidson® Inc.

ACTIVATING AND CHARGING BATTERY

1. Remove battery from motorcycle and place battery on a level surface.

CAUTION

Never activate a battery mounted on motorcycle. If electrolyte is accidentally spilled, it will severely damage the motorcycle.

2. See Figure 2. Remove reminder tag. Pull off short sealed tube on vent elbow. Check that vent elbow is dry and clean, and install long vent tube provided.

WARNING

A sealed tube left in place could cause a build-up in internal gas pressure. Internal gas pressure can cause a battery to explode.

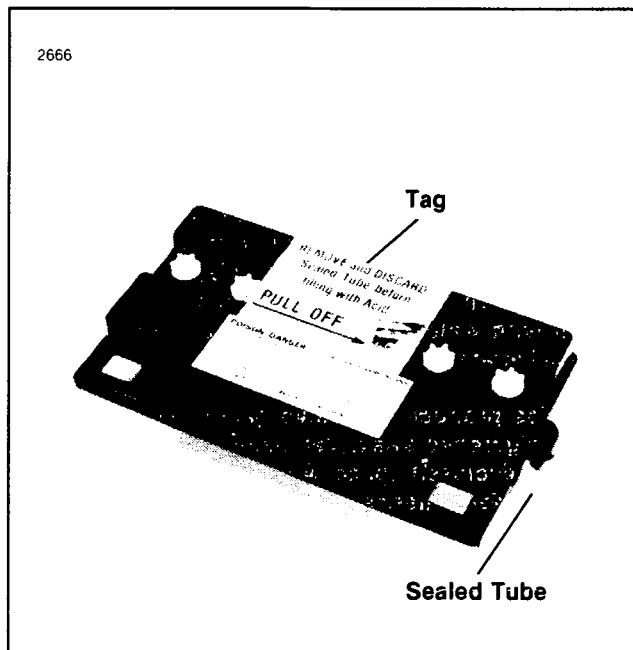


Figure 2. Reminder Tag and Sealed Tube

3. Perform this step only on those batteries with smooth (not barbed) vent elbow. See Figure 3. Install the clamp on the long tube, sliding it up against the battery surface. Rotate the clamp tangs as far as possible toward the battery so the tangs cannot catch on clothing.

NOTE

Batteries with barbed vent elbows do not require tube clamp.

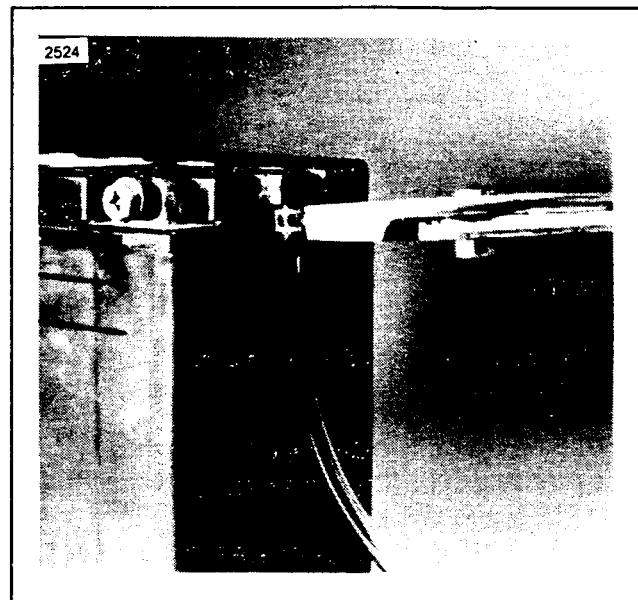


Figure 3. Tube Clamp Installation

4. Remove caps or vent plugs just before filling with electrolyte.
5. Fill battery carefully with electrolyte (diluted sulfuric acid) of a specific gravity of 1.265. Fill to UPPER LEVEL, as indicated on battery, or to proper level. Electrolyte should be at room temperature before filling. DO NOT USE WATER OR ANY OTHER LIQUID TO ACTIVATE. During cold weather, if electrolyte (acid) is stored in cold area, warm electrolyte to room temperature before filling.

WARNING

Electrolyte is sulfuric acid solution. Avoid spillage and contact with skin, eyes and clothing. See warning on back panel or top of battery.

6. Leave battery standing for 1/2 hour after filling. Move or gently jar battery so that the air between the plates will come out. Electrolyte level may have fallen during standing. Refill with electrolyte to UPPER LEVEL or proper level.

7. Before installation, the battery must be charged.

WARNING

Charging must be done in a well-ventilated area. Explosive hydrogen gas escapes from battery during charging. Avoid open flames or electrical spark near battery at all times, especially during charging.

Charging time is the most critical on low-maintenance batteries. Charging time will depend on the age of the battery and the type of charger you use.

Trickle charger or Christie charger	24 Hours
Tapered rate charger	
(automotive 4, 6, or 8 amp)	12 Hours

A trickle charger (1 amp or less charging current) may be used; however, it could take a long time for the 100% initial charge (24 hours). The recommended alternative, especially for the low-maintenance battery, is a variable/tapered-rate automotive style charger rated at 4, 6, or 8 amps. Depending on the model used, this type of charger might have an initial charging rate of 2-8 amps. Over a period of time, possibly as little as 1-2 hours, the charging rate will taper off to near 0 amps. At this point, the battery has probably attained a charging voltage of 14 volts or greater. Continue charging, even though you may achieve the proper hydrometer readings before the 12- or 24-hour charge time is completed. The additional time is necessary to set the plates, which is highly recommended on this style of battery.

If battery gets hot, over 110°F (44°C) (warm to the touch), discontinue charging and let battery cool. Continue charging until required specific gravity reading is obtained and charge time is complete.

NOTE

See Figure 4. The specific gravity of the electrolyte is the most accurate indication of the charging condition of the battery. When using a syringe hydrometer, read the electrolyte level at the bottom of the meniscus (curved surface of the fluid). Since specific gravity varies with temperature, and since the temperature of the electrolyte being checked is likely to be other than 80° F, the formula given below should be used to compute the specific gravity for any temperature. When the temperature is above 80° F, the reading of specific gravity goes down and vice versa.

- For each 10° F above 80°F, add 0.004 to the actual reading.
- For each 10°F below 80°F, subtract 0.004 from the actual reading.

Example:

Electrolyte temperature	100°F
Hydrometer reading	1.272
Adjustment for temperature	+0.008
Corrected specific gravity	1.280

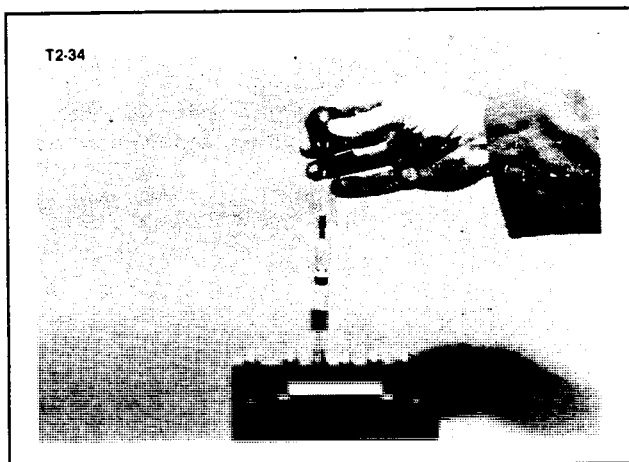


Figure 4. Checking Specific Gravity of Electrolyte Using Hydrometer (Kent-Moore Tool Number HD-96910-35)

8. After initial charge, gently agitate or jar the battery so that air bubbles/pockets between plates will loosen from plates and rise to upper surface of electrolyte. Check the electrolyte level. Refill with electrolyte to upper level (or proper level), if necessary. Charge an additional 1-2 hours after adding electrolyte.
9. Securely install vent plugs. Wash off any acid spillage from battery with water; wipe battery dry with a clean towel.
10. Mark the date on the battery.

Battery Installation

1. Clean cable connectors with wire brush or sandpaper to remove oxidation.

CAUTION

Connecting cables to wrong terminals of battery (positive cable to negative terminal, and negative cable to positive terminal) can cause serious damage to motorcycle electrical system.

2. After filling with electrolyte and charging, install new battery. Connect cables to the proper terminals. First, positive cable to positive terminal (+), and then negative cable to negative terminal (-). **CONNECT POSITIVE CABLE FIRST, NEGATIVE CABLE LAST.**
3. Check vent tube to avoid any crimping or obstruction to the tube.
4. Securely fasten battery to the motorcycle using its battery hold-down arrangement. This will minimize destructive vibration.

Battery Maintenance

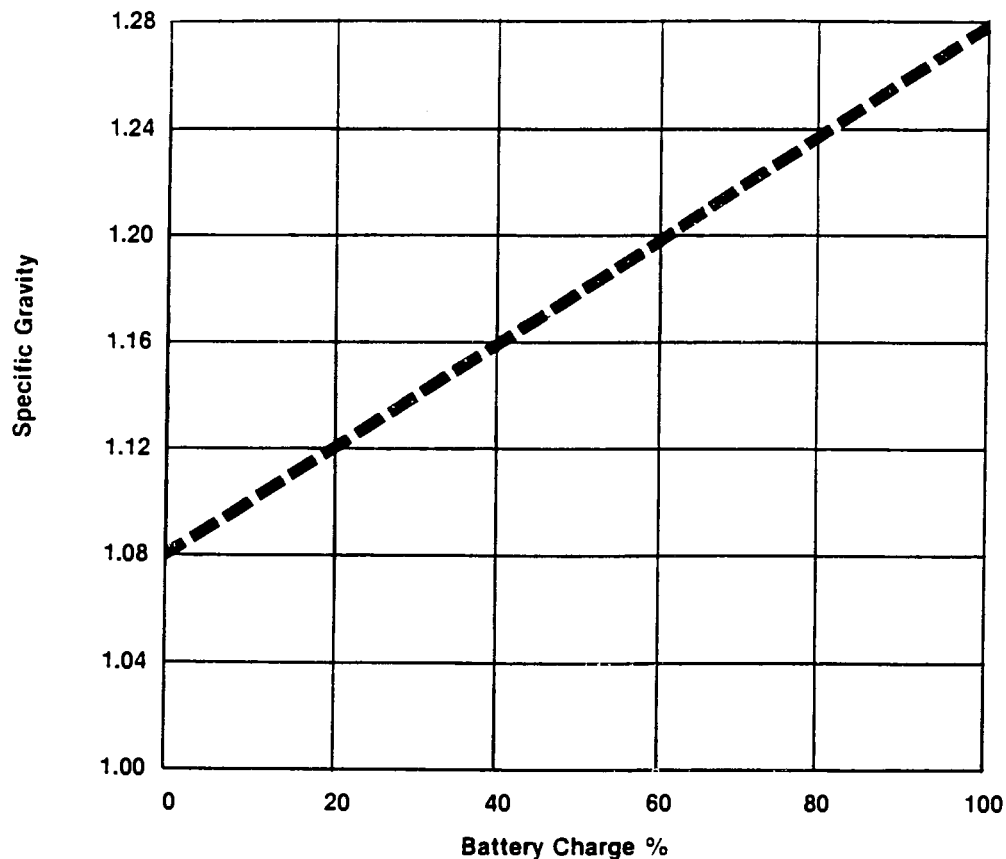
Recommend the following battery maintenance to your customers:

- Check electrolyte level once a month. If found below UPPER LEVEL or proper level, add distilled water to UPPER LEVEL or proper level. **NEVER USE** electrolyte to refill the battery. If electrolyte is added, the solution will become too strong for proper chemical action and will damage plates.
- Recharging is necessary when lights get dim, when starter sounds weak, and/or when battery is not used for longer than 2 weeks. Charge the battery until the specific gravity comes up to 1.270-1.280 at 80° F.

The following graph shows the relationship between the specific gravity of the electrolyte at 80° F and the percentage of battery charge.

Check the specific gravity and temperature of electrolyte, and find battery charge condition after correcting the specific gravity of electrolyte by temperature adjustment (see formula under BATTERY ACTIVATING).

SPECIFIC GRAVITY/BATTERY CHARGE RELATIONSHIP



Battery Storage

If the motorcycle will not be operated for several months, such as during the winter season, remove battery from motorcycle and charge until the correct specific gravity is obtained.

Charge the battery every month if it is stored at temperatures below 60° F (16° C). Charge battery more frequently than once a month if stored in a warm area, above 60° F (16° C).

WARNING

Store batteries where they cannot be reached by children.

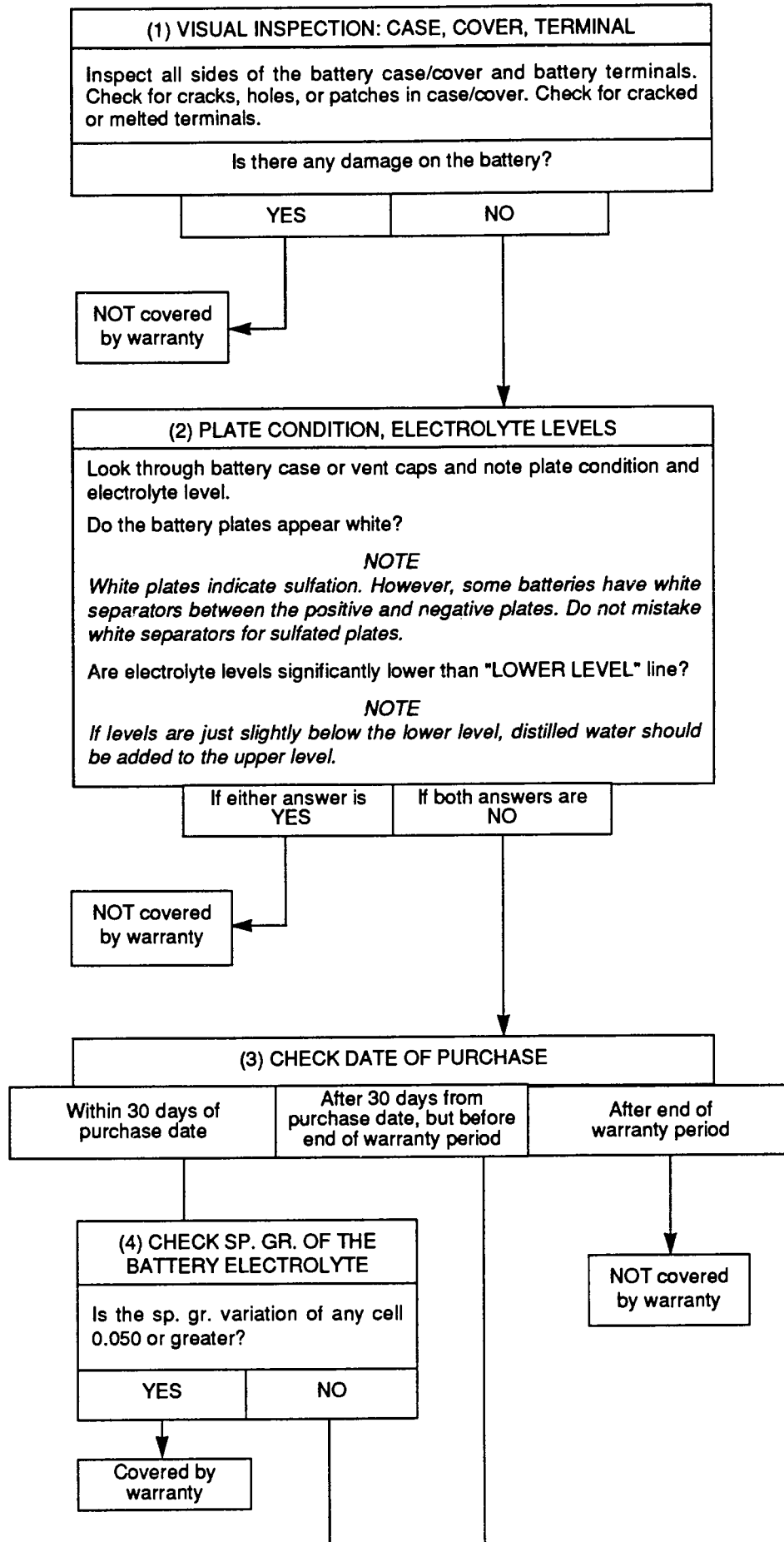
CAUTION

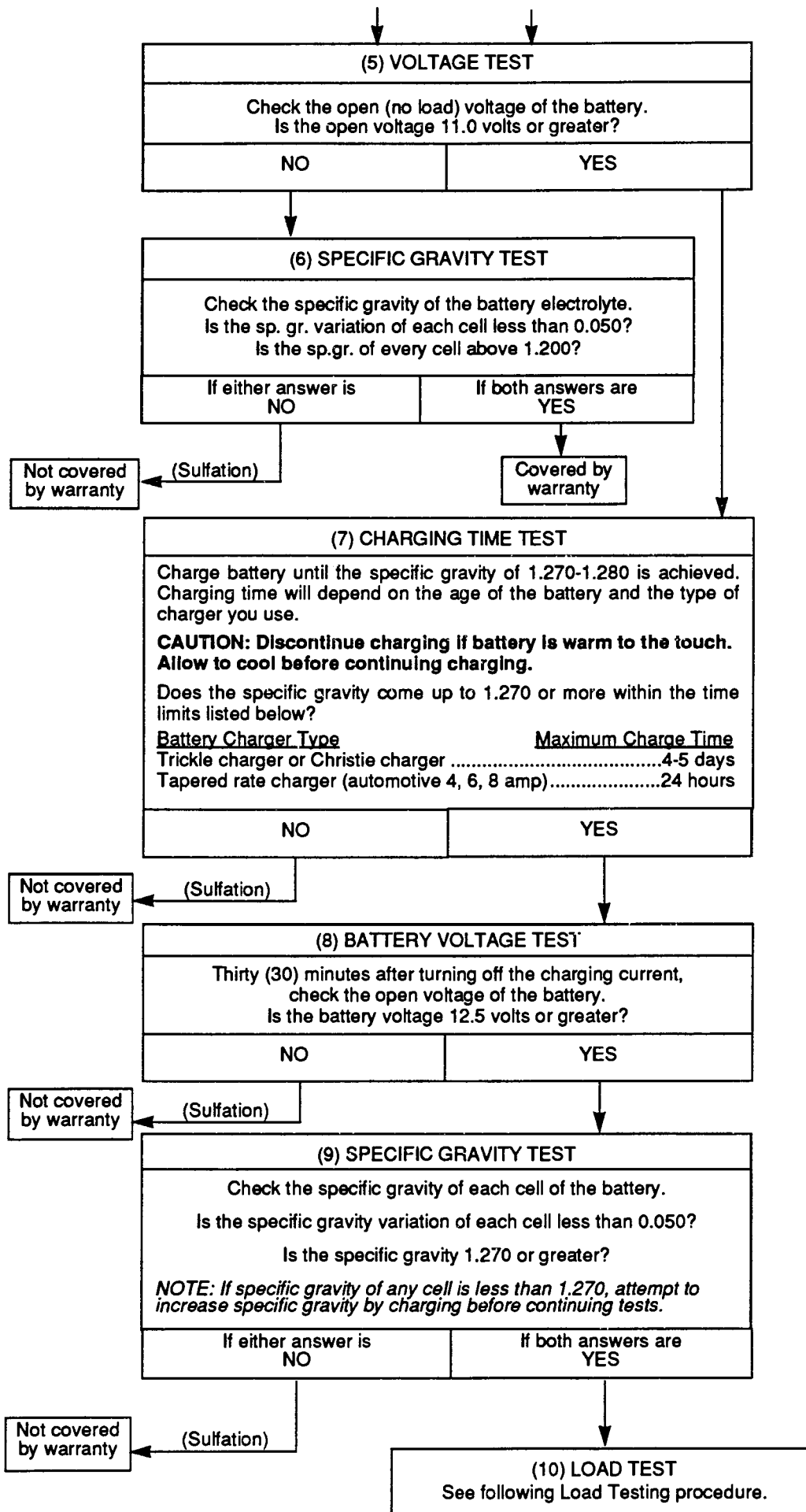
The electrolyte in a discharged battery will freeze if exposed to freezing temperatures. Freezing may crack battery case and buckle battery plates rendering battery inoperative.

Battery Testing

Use the following procedures to test battery conditions, and to determine if a battery requiring replacement will be covered by warranty.

MOTORCYCLE BATTERY TEST PROCEDURE





LOAD TESTING (Figure 5)

Fully charge the battery before testing. Attach load tester as shown. Load battery to 3 times ampere-hour rating for 15 seconds using a suitable tester (load FLT model batteries to 60 amperes; load XL, FX, and FXR model batteries to 57 amperes). Voltage reading after 15 seconds should be 9.6 volts or more. Record voltage on battery test sheet. A reading of zero volts would indicate an open circuit.

WARNING

Load tester must be "OFF" before removing test leads from battery. Removing leads with tester "ON" could cause spark and possible explosion.

CAUTION

Do not leave any load switch turned on for more than 20 seconds; otherwise, overheating and tester damage might occur.

LOAD TESTING WITHOUT LOAD TESTER EQUIPMENT

A limited load test can be performed without a load tester. First, take hydrometer readings. Then, place a voltmeter across the battery posts, and activate the starter. If the specific gravity is 1.220 or higher, but the voltmeter reads zero volts, an open circuit is indicated.

This limited load test can only be used to determine if an open circuit exists within the battery. The test cannot be used to determine the battery's actual voltage generated under load.

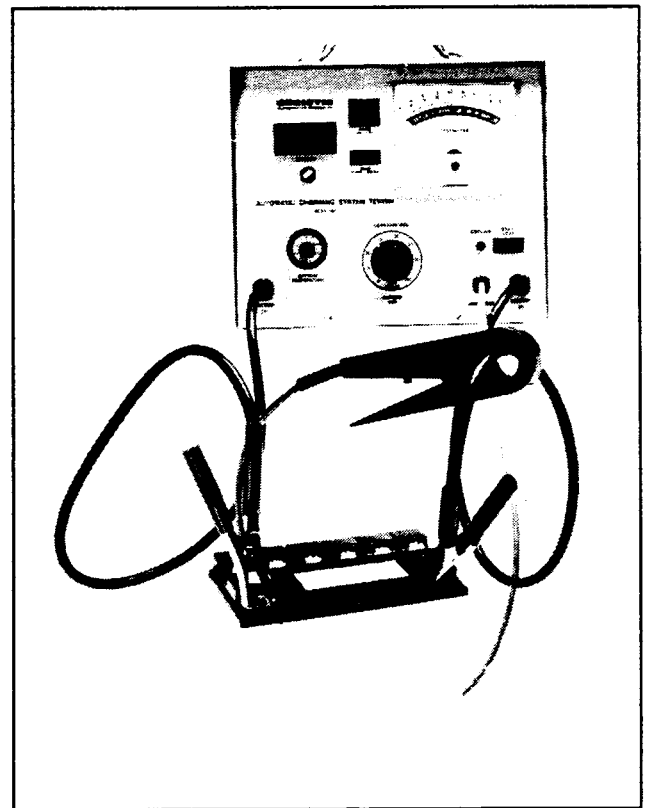
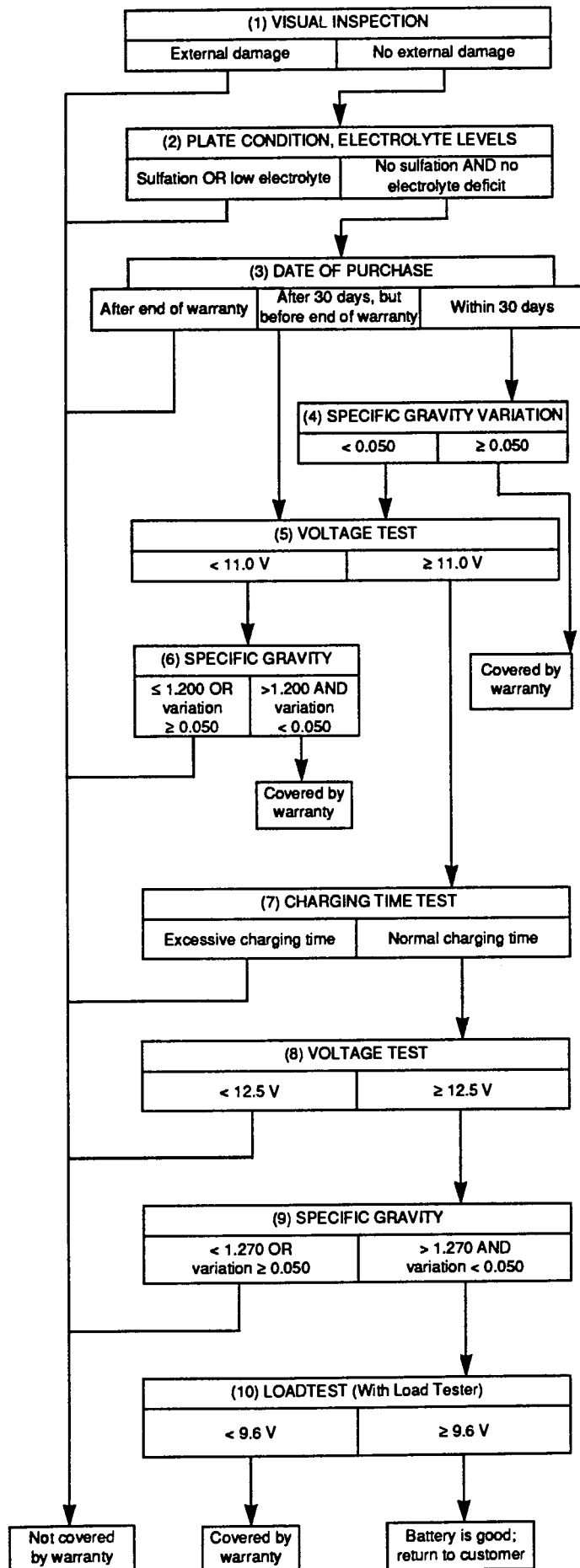


Figure 5. Load Test

BATTERY TEST SHEET



< means LESS THAN
 ≤ means LESS THAN or EQUAL TO
 > means GREATER THAN
 ≥ means GREATER THAN or EQUAL TO

Before Charge

Cell No.	Specific Gravity	Electrolyte Temperature
+1		°F
2		
3		Battery Voltage
4		
5		volts
-6		

After Charge

Cell No.	Specific Gravity	Electrolyte Temperature
+1		°F
2		
3		Battery Voltage
4		
5		volts
-6		