GS Yuasa E-Learning Support Documentation

CV Battery Applications, Maintenance & Care

Overview:

This support documentation has been designed to work in conjunction with the GS Yuasa e-learning course "CV Battery Applications, Maintenance & Care" and covers of the following subjects:

- **24 Volt series system**
- **Battery application**
- **24 Volt battery pack replacement**
- **24 Volt battery pack maintenance**
- **Tips for prolonging battery life**

24 Volt series system

Overview

Most heavy vehicles use 24-Volt electrical systems because of the very high power needed to start large engines. A 24-Volt system is made up of two 12-Volt batteries connected in series and is known as a pack. The voltages of each battery are added together whilst the Ah capacity of the pack remains the same as that of a single battery.

With the high cost of vehicle recovery, delivery rescheduling and disappointed customers, it is essential that battery quality and maintenance are given a high priority. This will ensure the longest possible battery service life and reduce the costs associated with battery related breakdowns.

Battery application

Battery applications & consumers

Battery performance and service life is affected by the number of additional electrical consumers on the vehicle and their power requirements. Some of the most popular additional consumers and their power requirements are a refrigerator at 2 amps, parking heater at 7 amps, interior lighting at 5 amps and entertainment systems at 4 amps. If these additional consumers are used together for a period of 10 hours whilst the vehicle is parked they will collectively consume 180Ah from the battery pack.

As a 225Ah battery can only use approximately 50% of its energy before its lifetime is reduced this could drain the battery pack to a level where engine starting is not possible. It is therefore essential that batteries have adequate specification to support these additional consumers and that they are managed by the driver when the engine is off to prevent deep battery discharge and an engine non-start.

24-Volt battery pack replacement

Pairing replacement batteries

When replacing batteries in 24-Volt series circuit it is essential both are replaced at the same time. Both batteries must be of the same technology, have the same amp hour capacity, cold cranking specification and voltage.

If only one battery is replaced, then the differences in capacity when being charged will result in the overcharging of one battery while the other remains undercharged and when not being charged the used battery will drain electrical energy from the new one due to the voltage drop between the two. This reduces the total amount of power available across the two batteries.

Replacing in pairs ensures that the battery pack is balanced and eliminates most of the problems associated with cycling batteries connected in series.

24-Volt battery pack maintenance

Over time it is best practice to check each individual battery voltage and recharge as required. At the end of a charge cycle and after leaving the batteries to stabilise for a minimum of 4 hours check each battery voltage as this this will indicate the biggest difference in voltage, if there is one.

There are two ways to equalise the voltage difference if one is detected. Firstly, fully charge the pack with a 24-Volt charger, then bring up the lowest battery with a 12-Volt charger. There is no need to disconnect the series connections to do this if you can access just the battery with the lowest voltage. Alternatively charge each individual battery with a 12-Volt charger. In each case check the individual battery voltages after charging and stabilisation. Next time you charge and check the voltages, you should see the batteries are closer in voltage at the end of the charge cycle.

NOTE: Direct connection of a non-OE 12 -Volt consumer to a single battery in the pack is not recommended as it can lead to charge imbalance problems.

Tips for prolonging CV battery life

Overview

The best way to optimise reliable battery performance, service life and reduce the likelihood of a vehicle breakdown is to check and maintain frequently.

Recharge regularly

Check and recharge your batteries at least every 3 weeks but more if there is an opportunity like overnight stops, weekend breaks or when vehicle inspections or repairs are necessary. If possible always use an external charger with a minimum 10% output of the ampere hour capacity of the batteries, intelligent charging control and temperature compensation. This is because the alternator will only top charge up to 90% if the temperature is at least 25°C outside due to the maximum charge voltage regulation of 28.8 Volts. Top charging batteries using an external charger also reduces fuel consumption as charging using the alternator increases fuel consumption by apptoximately1.5%.

Terminal cleanliness

Always check and keep battery connections clean to guarantee a good connection between the battery and the cable clamps.

Battery status indicator

Closely monitor the vehicles battery condition indicator if fitted as this shows battery status and current usage. The system may also be capable of issuing alerts to the driver if a low state of charge is detected.

Use of electrical consumers

Every consumer from the in-cab fridge to charging a mobile telephone or tablet will discharge the battery. Ensure that all possible electrical consumers are switched off if not required especially during long stops.

Winter care

A temperature drop from +20°C to -18°C reduces battery capacity by approximately 50%. At low temperatures pay special attention to the battery's condition and ensure only essential electrical consumers are used when the vehicle isn't in operation.

Parking mode

Most modern commercial vehicles feature a parking mode. This reduces the amount of battery load during stops by shutting down the refrigerator and comfort and convenience systems such as interior lights and audio. This system should always be activated when the use of in cab features is not required and the driver is away from the vehicle.