

Fleet Maintenance Training Series

Vehicle Cranking and Charging

Course length – 1 day

Prerequisites – None

Typical class size – 4 to 6 individuals

Instructors – one



Course Summary

According to the American Trucking Association (ATA), nearly half of the breakdowns that take place during the winter months can be attributed to cranking and charging problems. What's even worse is that almost 75% of battery and cranking failures on the road are doomed to occur over and over again. Vehicle cranking charging problems are some of the most commonly misunderstood and misdiagnosed problems on heavy trucks. In some cases, batteries, starters or alternators are replaced multiple times within a one or two week period until the actual root cause is determined and repaired. In many cases, the removed parts have years of life left in them, but sadly they are almost never recovered or placed back into service. This can add up to thousands of dollars in unnecessary cost - not to mention multiple breakdowns for the same unit. Enter Fleet Group's Vehicle Cranking and Charging Course.

The Vehicle Cranking and Charging Course is designed to provide hands on practical instruction which includes both lecture (theory) and practical (hands-on) training formats at your location. This 1 day class is designed to give your technicians the training they need to properly check, diagnose and repair the cranking and charging systems in your vehicles. This allows them to identify problems in your shop before they become problems for you and your customers on the road. The course covers instruction on the operation and care of the new (or existing) battery and charging system testing equipment at the maintenance facilities, and the safety concerns of handling batteries and electrical components during testing and installation. The Vehicle Cranking and Charging Course should be an integral part of any good Preventive Maintenance Program.

Note: This course covers 12 Volt systems, but the same principles apply to all vehicle cranking and charging systems. Please be aware that there are other systems available.

Course Topics

Items to be covered during the training:

- Introduction – Why C&C Program?
- Formal C&C Policy
- Introduction to Proper Tools
- Properly Equipped C&C Area
- Safety Procedures
- Fundamentals of Electricity
- Basic Electric Elements
 - Voltage
 - Resistance
 - Current
 - Magnetic Field
- Instruments
 - Voltmeter
 - Ammeter
 - Ohmmeter
 - Carbon Pile
- Basic Heavy-Duty Electrical System
 - Batteries
 - Visual Inspection
 - Specific Gravity Test
 - Surface Charge
 - Load Test
 - Cranking
 - Battery Cable Test
 - Starter Solenoid Circuit Test
 - Charging System
 - Alternator Wiring Test

Course Deliverables

Following the course, participants will be able to:

- Demonstrate an understanding of all electrical system precautions and safety rules
- Understand basic electrical concepts of voltage, current, and resistance and magnetic field
- Identify and properly use required electrical testing tools - Voltmeter, Ammeter, Ohmmeter, Battery Tester
- Identify and understand the operation of the basic components of a standard heavy-duty electrical system:
 - Identify and properly test vehicle batteries
 - Identify and properly test alternator and charging system
 - Identify and properly test starter and cranking system
- Maintain electrical testing and charging equipment

Client Responsibilities

In order for this training to be effective, the client will need to provide the following powered equipment, basic tools, and an appropriate shop and training environment:

Shop Needs:

- Clean and uncluttered area in the shop with adequate lighting to be utilized during the practical portion of the training.
- Three vehicles to be utilized during the training

Tools:

- A variable carbon pile load tester, 500 amps minimum, with ammeter.
- A separate DC voltmeter*, digital preferred, capable of reading 0.1 volt increments.
- Inductive (clamp-on) ammeter for quick, easy alternator output measurements.
- Hydrometer if conventional batteries are used. (with removable caps)
- TruckLite 97025 Electrical Connection Brush Kit (or equivalent)
- AC Delco ST1201 Charging Post Adapters (Qty 16)
- Workbench located near the training vehicles
- Access to basic hand tools
- Wheel chocks
- Flash lights
- Creepers
- Rags
- Company required Personal Protective Equipment (PPE):
 - Safety glasses
 - Face shield
 - Baking soda
 - Rubber apron
 - Rubber Gloves
 - Bottles of Eye Wash or Eye Wash Station

**Some carbon pile load testers include a digital voltmeter with leads for external hook-up.*

Class Room:

Adequate classroom space free of distractions to include:

- Presentation projector (notify Fleet Group in advance if we need to provide the projector)
- Projector screen
- Dry erase board w/markers of various colors (flip chart if dry erase board is not available)
- Seating and table for all participants and trainer
- Catered lunch for each day
- The names of each participant at least 6 days prior to the training session