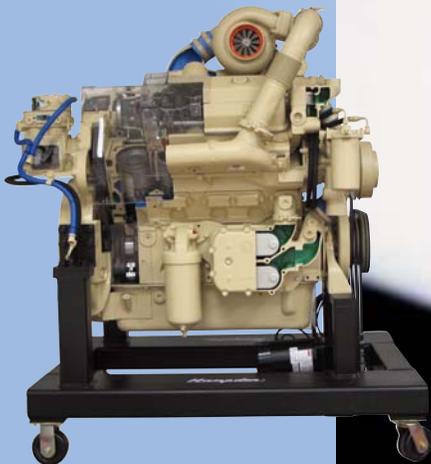
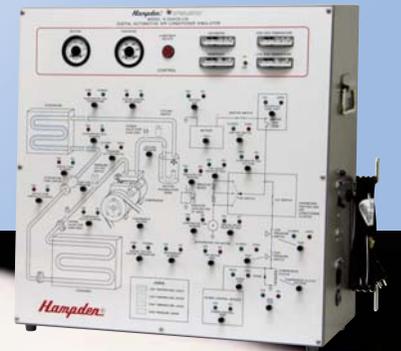
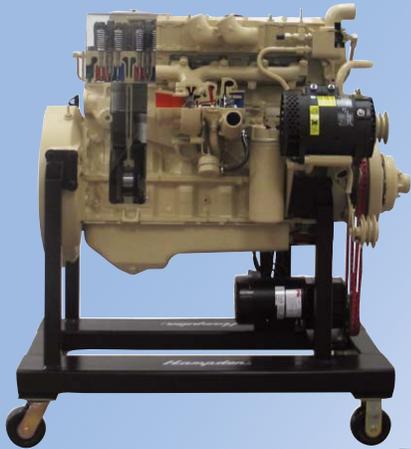


# AUTOMOTIVE DIESEL ENGINE SYSTEMS



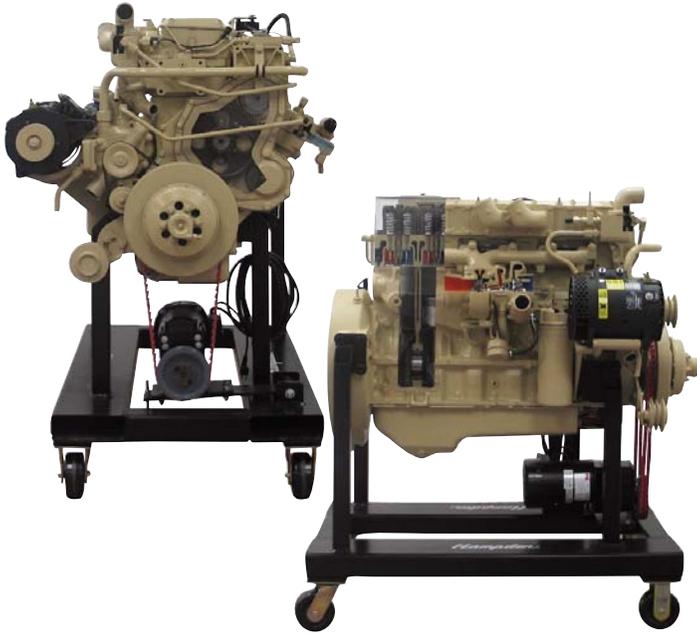
# DIESEL



**Hampden**<sup>®</sup>  
ENGINEERING CORPORATION



# DIESEL ENGINE CUTAWAYS



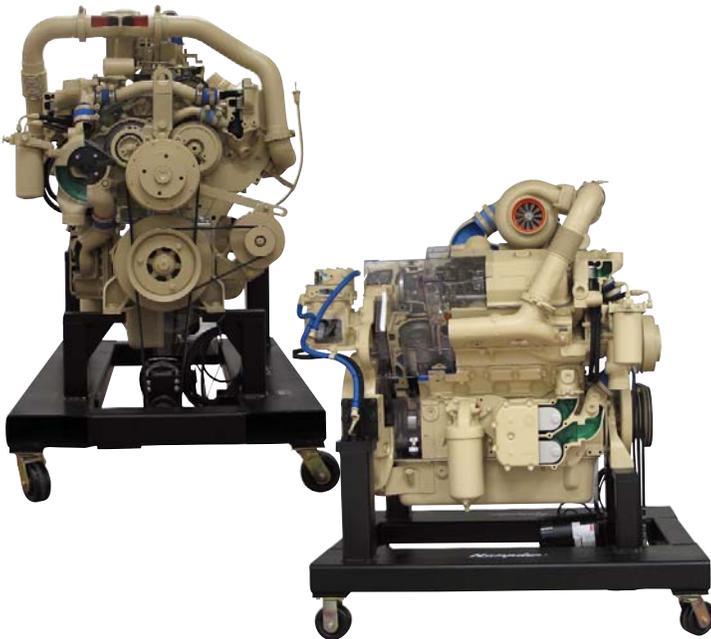
**H-CAT-3116-CA  
Caterpillar Engine Cutaway  
on Mobile Stand**

## Cutaway Engines

Engine is mounted on a steel base with drive motor and castors.  
Training cutaway areas on engine will include:

- Thermostat Housing
- Cylinder Head
- Valve Cover
- Air Intake
- Water Pump
- Oil Pan
- Manifold
- Fuel Pump
- Fuel Pickup Pump
- Engine Block
- Lube Pump
- Front Gear Housing

External parts and cut surfaces will be painted. Internal working parts will be lubed for rotation (approximately 3 RPM)  
Openings will be shielded with plastic covers for safety.



**H-DET-8V-92TA-CA  
Detroit Engine Cutaway  
on Mobile Stand**



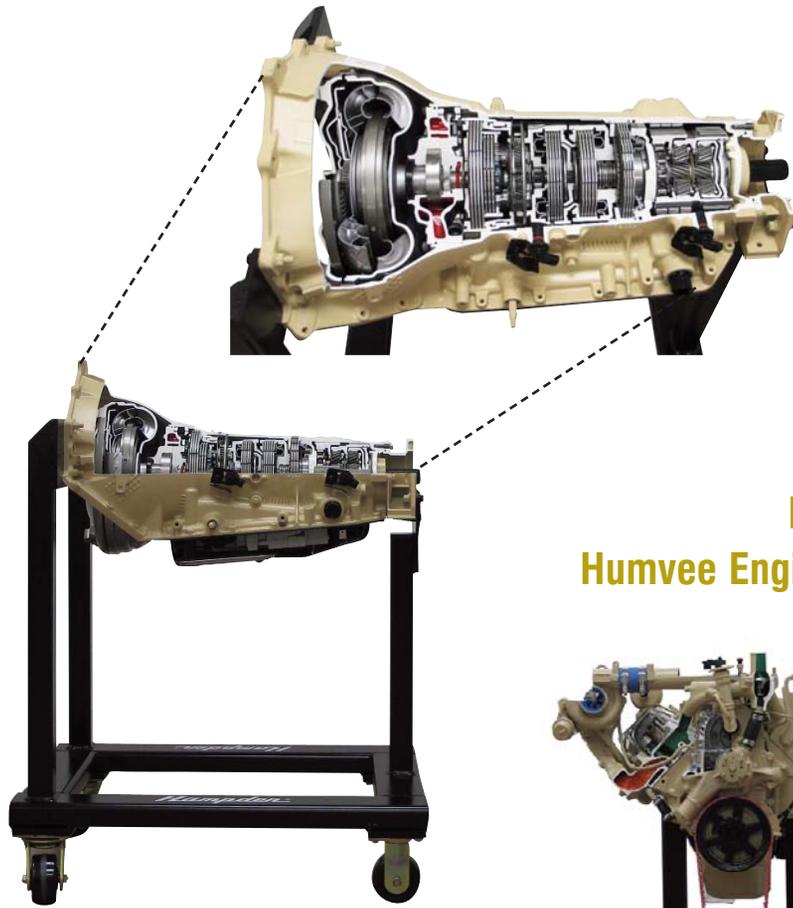
**H-HMMWV-6.2-CA  
Humvee Engine Cutaway  
on Mobile Stand**

***Everything  
you ever wanted to know  
about your  
Humvee Motor***

*Hampden Engineering Corporation*  
**DIESEL ENGINE CUTAWAYS**

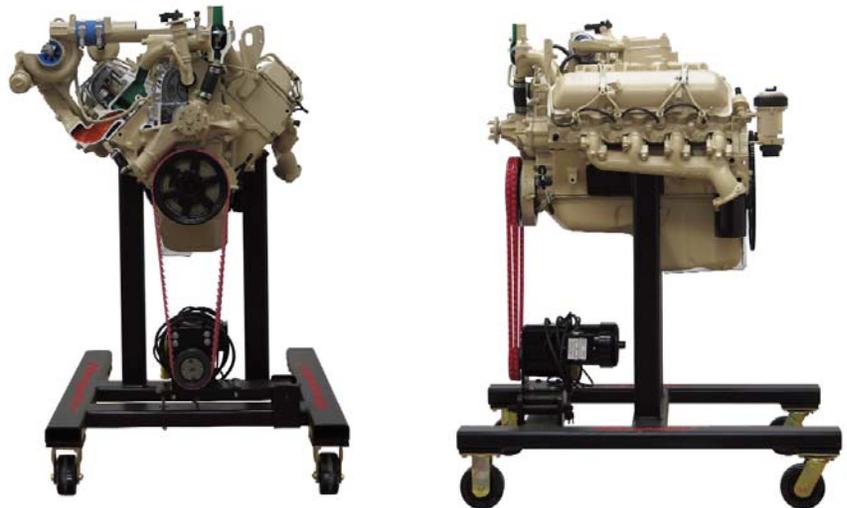
← **H-HMMWV-4L80E-CA**  
**Hampden Humvee**  
**Cutaway Transmission**

Transmission is mounted on a steel base with castors and includes training cutaway areas to provide visual access to the internal working components. External parts and cut surfaces will be painted.



**H-HMMWV-6.5-CA**

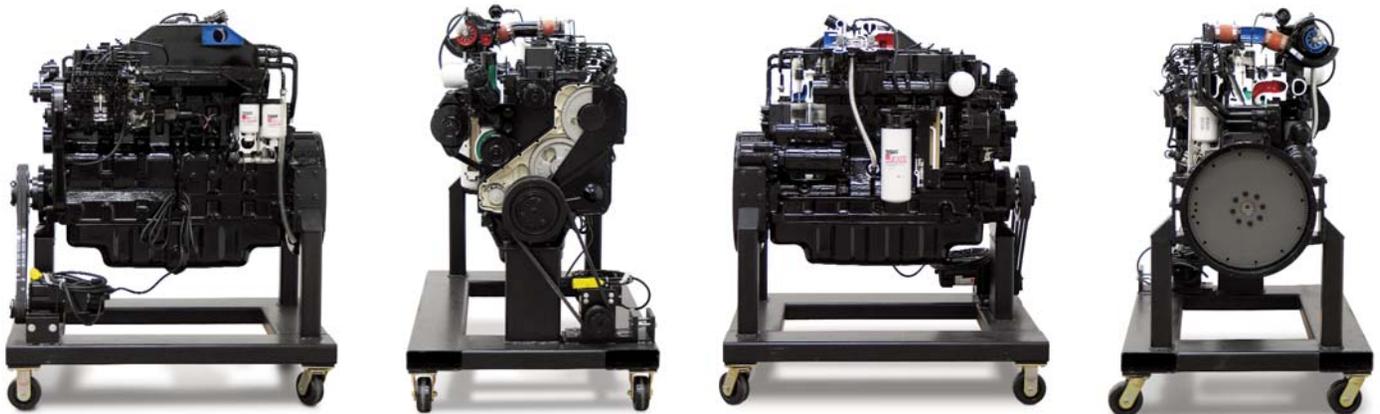
**Humvee Engine Cutaway on Mobile Stand** ↓



**H-CD-46C-CA** ↓

**Four-Cycle Diesel**  
**Engine Simulator**

Hampden's series of full size cutaway engines provide a complete training experience. Interior components are color coded.



***Standard Products...Designed to Meet Your Growing Needs!***



**Working Engines**

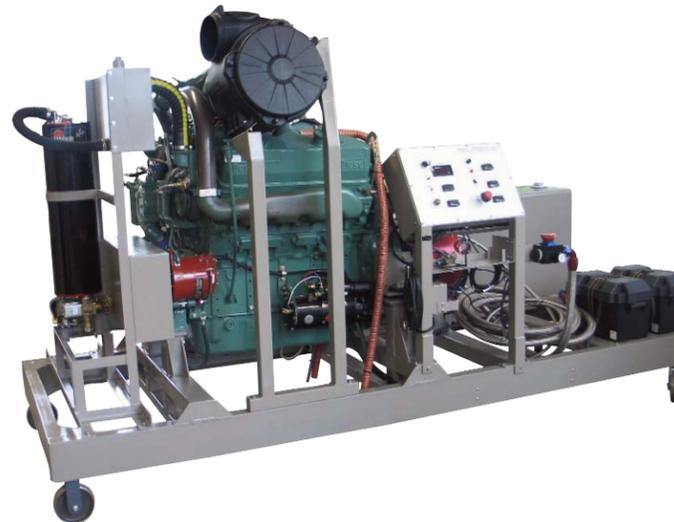
Engine with Dynamometer is mounted on a mobile stand/frame with control panel. The performance of the engine can be monitored on both the control panel and on a computer via the included data logging package. Coupled to the engine is a 19" toroid water-brake with the ability to load a 1,000 hp motor. The water-brake will allow the engine to be tested at full load. Hampden Working Engines will include:

- Engine
- Fuel Tank 50 gal. with level gauge
- Control Panel with:
  - Digital Water Temperature Display
  - Digital Tachometer
  - Digital Volts Meter
  - Digital Amp Meter
  - Digital Oil Pressure Display
  - Digital Fuel Pressure Display
  - Key Start Switch
  - Throttle Control
  - Emergency Stop with Reset
- Batteries (2)
- DC to AC Inverter
- Cooling Tower (Replaces the Radiator and Fan Blade)
- Dynamometer with Load Valve

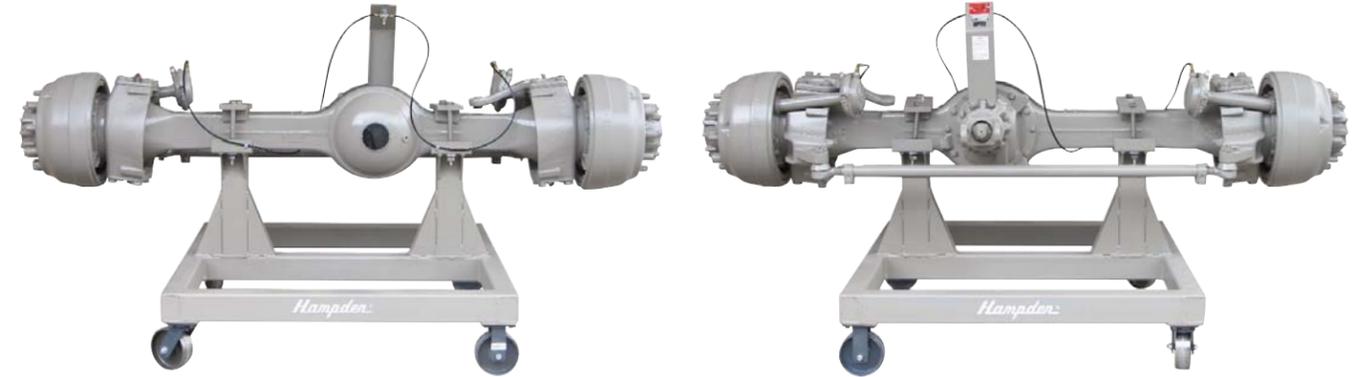
**H-CAT-3116**  
**Caterpillar Engine on Mobile Stand with Dynamometer**



**H-DET-8V-92TA**  
**Detroit Engine on Mobile Stand with Dynamometer**



Panel used for H-DET-8V-92TA and H-CAT-3116



**H-PLS-BSTT**  
**Palletized Load System Air Brake with Cutaway Axle**

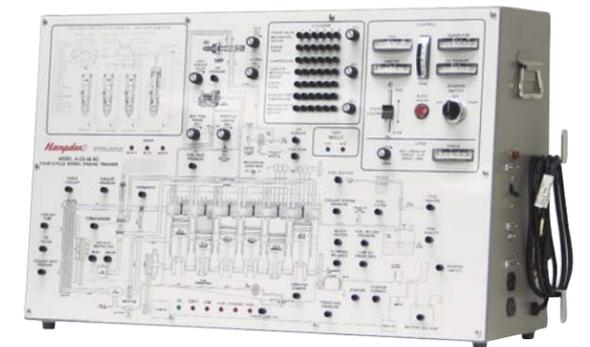
The front axle of a LMTV will be mounted on a steel base with castors. The braking system will be fully operational with the air actuators being plumbed back to a lever operated pneumatic switch. The center of the axle assembly will be cutaway to provide visual access to the internal parts, the opening will be shielded with plastic covers for safety.

**Mechanical Maintenance**



◀ **Hampden Cutaways** allow for convenient classroom training for the operation, construction, and maintenance of common industrial components. Through carefully planned sectioning and color-coding, the complete internal configuration of each component is exposed and showcased. Seal features and hardware locations have been retained.

**Model H-CD-46-RC →**  
**Four-Cycle, Six-Cylinder**  
**Digital Diesel Engine Simulator**





Simulators have 40 malfunctions built in, which may be inserted singly or in multiples. Additionally, malfunctions may be inserted before their “permissible” have been reached that is, a battery or starter failure may be selected while the engine is running. However, the system will not signal the problem until the engine is turned off and an attempt is made to restart.

Student tracking prints reports for all operator actions during a malfunction troubleshooting session.

MODEL*	ENGINE	APPLICATION
H-DD-24	Detroit Diesel 471T	Marine – Generator – Industrial
H-CD-46	Cummins NC-855	Automotive – Industrial – Generator – Marine
H-CD-46B	Cummins 6BT-5.9	Automotive (On & Off Road)
H-CD-46C	Cummins 6CTA-8.3	Automotive – Industrial – Generator – Marine
H-DD-48	Detroit Allison 8.2L	Automotive – Industrial – Generator – Marine
H-JD-44	John Deere 4-276T	Generator – Industrial

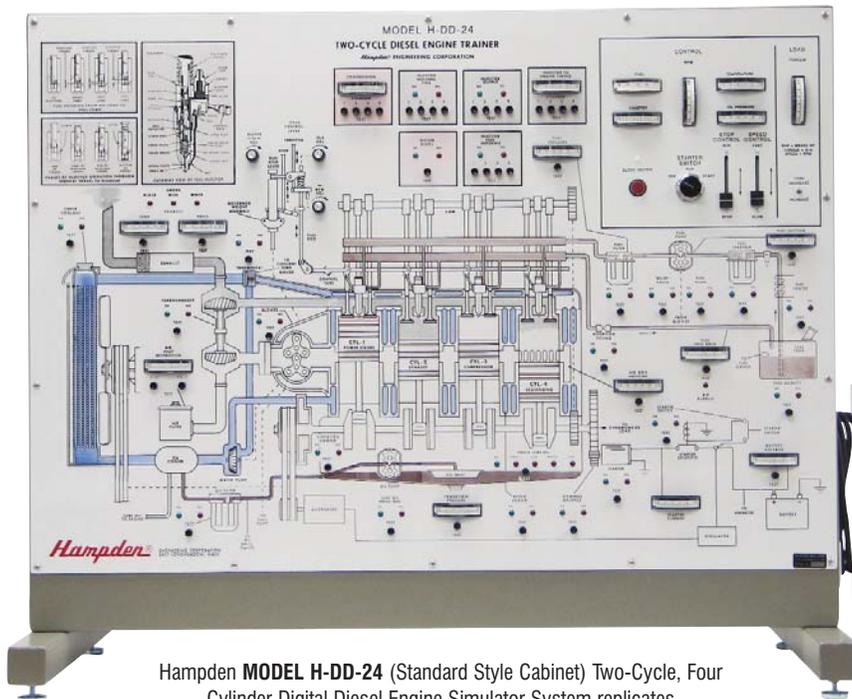
\* All Models are available in Standard and RC sizes.  
For RC size, add -RC to Model Number.



All trainers are controlled by a PC-compatible computer system. The Hampden H-LTCS is a fast, rugged, expandable, American-made system that is built to stand-up to the heavy demands of an education environment.



Component test switches and indicator lights monitor the status of components and allow for hands-on troubleshooting.



Hampden **MODEL H-DD-24** (Standard Style Cabinet) Two-Cycle, Four Cylinder Digital Diesel Engine Simulator System replicates all functions of a Detroit Diesel 471T engine.  
Includes computer.  
Unit size: 34”H x 43”W x 22”D

All standard sized trainers (shown at right) are housed in rugged table-top enclosures with expanded tri-colored graphics representing the full pictorial layout of the engine.

An RC style cabinet, (shown at left), is sized down from the standard model for classrooms where portability and space are considerations.

Hampden offers the broadest array of digital diesel simulation training systems available today. Also, with new models introduced into service every year, Hampden Engineering Corporation continues to develop new training systems based on these state-of-the-art engines.

# AUTOMOTIVE TROUBLESHOOTING TRAINERS

## Charging System

Hampden's **Model H-AUTO-ICS** provides training in the principles of automotive charging systems, displaying both internal and external voltage regulators. Simplified techniques are demonstrated to pinpoint problems in automotive charging systems.

### Testing Capabilities

- Battery
- Battery Cables
- Alternator Drive Belt
- Charging System – Volts
- Voltage Regulator
- Voltage Run Test
- Voltage Regulator
- Electrical Connections

## Storage Battery

Hampden's **Model H-AUTO-SB** provides training on testing automotive batteries utilizing hand held digital multimeters.

### Testing Capabilities

- Normal Battery Operation
- Battery Status
- Battery Capacity
- Battery Terminals
- Battery Charging
- Battery Drain Test
- Voltage Drop from Battery to Load
- Battery Testing
- Jump Start Vehicle from Another Vehicle
- Battery Cell Testing

### MODEL H-AUTO-BS

demonstrates brake system fundamentals, featuring disc and drum brake theory and repair.



### MODEL H-AUTO-CS

demonstrates cooling system fundamentals, troubleshooting and repair. Radiator status is presented.



## Braking System

Hampden's **Model H-AUTO-BS** demonstrates brake system fundamentals, featuring disc and drum brake theory and repair.

### Testing Capabilities

- Master Cylinder
- Brake System Metering Valve
- Rear Drum Brakes
- Self Adjusting Drum Brakes
- Emergency Brake
- Front Disc Brake
- Spongy Brake Pedal
- Power Brake

## Cooling System

Hampden's **Model H-AUTO-CS** demonstrates cooling system fundamentals, troubleshooting and repair. Radiator status is presented.

### Testing Capabilities

- Coolant Capacity
- Water Pump Drive Belt
- Radiator Cap
- Coolant Mixture
- Radiator Hose
- Water Pump
- Coolant Leak
- Radiator
- Thermostat Test
- Fan
- Electrical Control

## Starting System

Hampden's **Model H-AUTO-SS** provides training in the use of digital multimeters to pinpoint problems in automotive starting systems.

### Testing Capabilities

- Battery
- Battery Cables
- Ignition Switch
- Neutral Safety Switch
- Starter Motor Solenoid
- Starter Motor
- Slow Cranking
- Fusible Link
- Power Train Module
- Flywheel
- Charging
- Engine Ignition
- Power Train
- Fuel

## Air Conditioning

Hampden's **Model H-DAACS-CSI** demonstrates the principles of operation and troubleshooting of current factory installed AC systems.

### Testing Capabilities

- Suction, discharge, pressure and temperature gauges
- Built-in voltage and continuity probes
- Adjustable ambient temperature control
- Three-speed fan control and LPCO control
- Adjustable RPM control

## Automotive Heating

Hampden's **Model H-AUTO-AH** demonstrates procedures used to repair automotive heating systems.

### Testing Capabilities

- Duct Delivery
- Heater Blower
- Control
- Heater Core
- Thermostat

## Lighting System

Hampden's **Model H-AUTO-LS** demonstrates the application of basic electrical theory to troubleshoot automotive lighting systems.

### Testing Capabilities

- Power Distribution
- Light Switch
- Head Lamps
- Turn and Hazard Light
- Rear Backup Lamps
- Front Parking Lamps
- Daytime Running Lamps
- Fog Lamps

## Electrical Diagnosis

Hampden's **Model H-AUTO-ED** emphasizes applying the basics of electricity to troubleshooting automotive electrical and electronic systems.

### Testing Capabilities

- Battery Test
- Charging System
- Short in a Circuit
- Open
- Identify Component Cluster
- Pinpointing Shorts to Ground
- Pinpointing Opens in Circuit
- Select Faults
  - No Dome Light
  - No Brake Light
  - No Lights
  - No Blower
  - No Wipers
  - Slow Cranking
  - Won't Start

## Fuel Delivery System

Hampden's **Model H-AUTO-FDS** trains the student to pinpoint the problem area and make the proper repair.

### Testing Capabilities

- Fuel Tank foreign matter
- Internal Fuel Pump
- External Fuel Pump
- Restricted Fuel Filter
- Pressure Regulator Test
- Select Faults
  - ▶ Carbureted
    - Fuel Filter Plugged
    - Mechanical Pump Failure
    - Fuel Sock Plugged
    - Idle Adjustment
    - Fuel Tank Empty
  - ▶ Fuel Injected
    - PCM Failure
    - Fuel Filter Plugged
    - Fuel Pump Failure
    - Fuel Rail-Fuel Injector Pulsing



## Automotive Simulators

Hampden's line of **Computer Assisted Panel Instruction Modules** have been designed to provide realistic System Operation & Troubleshooting functions to virtually **ANY CLASSROOM!**

Each module's front panel is silkscreened with a complete schematic & pictorial layout of all system operations and combined with actual test-point pushbuttons, LEDs and meters.

All units are controlled via a laptop computer (supplied) using supplied Hampden software and USB I/O Interface. Automotive Trainers are as follows:

- **H-AUTO-ICS** Charging System Simulator
- **H-AUTO-SB** Storage Battery Simulator
- **H-AUTO-BS** Braking System Simulator (shown)
- **H-AUTO-CS** Cooling System Simulator (shown)
- **H-AUTO-SS** Starting System Simulator
- **H-AUTO-AH** Automotive Heating Simulator
- **H-AUTO-LS** Lighting System Simulator
- **H-AUTO-ED** Electrical Diagnosis Simulator
- **H-AUTO-FDS** Fuel Deliver System Simulator
- **H-DAACS-CSI** Air Conditioning Simulator (shown)

**MODEL H-DAACS-CSI** demonstrates the principles of operation and troubleshooting of current factory installed AC systems.

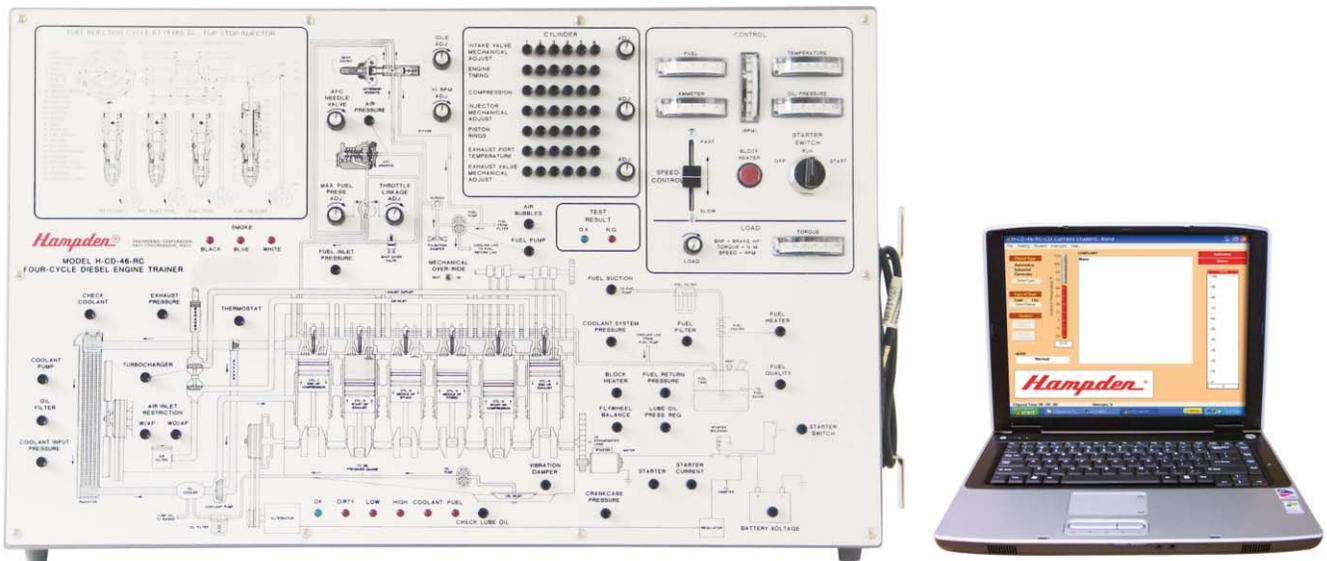


# DIESEL ENGINE SIMULATION SYSTEMS

## State-Of-The Art Diesel Engine Simulation Systems Provide Hands-On Experience in the Classroom

Hampden Engineering Corporation offers a line of diesel engine simulation products specifically designed to accurately replicate complete running diesel systems within the structure of a classroom environment. Students and instructors will be able to start-up, operate and troubleshoot all functional components of a simulated system under a variety of conditions. Every functional component, control and indicating device is included as well as

status test buttons at all crucial locations. Students can develop real system skills and 'by the book' diagnostic procedures quickly and easily. An interactive menu allows the instructor to determine the operating mode of the simulator, starting temperature, introduction of faults and malfunctions, testing of components and monitoring students' performance.



Hampden **MODEL H-CD-46-RC** (in RC Style Cabinet) Four-Cycle Diesel Engine Simulator System replicates all functions of a Cumins NC-855 engine. Includes computer as shown. Unit size: 22"H x 32"W x 22"D



Hampden is committed to providing industry-leading technology.

For the latest from Hampden, visit our home page at <http://www.hampden.com> or e-mail us at [sales@hampden.com](mailto:sales@hampden.com)

# Hampden®

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