



**Michigan Custom Machines, Inc.**  
22750 Heslip Drive  
Novi, MI 48375  
(248) 347-7900

**COMMON RAIL SYSTEM BENCH**

ISO 9001:2000  
REGISTERED

AUTOMATION  
ALLEY™

AMT  
The Association For  
Manufacturing Technology

The purpose of the MCM Common Rail System Bench, is to actuate a complete diesel common rail fuel system as it would on the engine and measure its performance. As this machine was designed for product development, it is also capable of mapping all of the fuel system to reveal problem areas of operation. Measured parameters for six injectors are discharge (up to five splits), reaction time, bypass flow, bypass temperature and bypass pressure. Measured parameters for pumps are speed, output flow, output pressure, bypass flow, bypass temperature and bypass pressure. Typical calibration fluid is Viscor 1487 (ISO 4113).

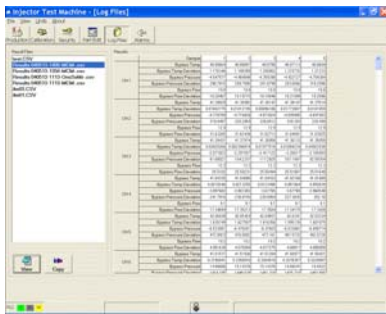


#### **Common Rail Description**

A common rail, diesel fuel system is different from a unit injector fuel system in that the high pressure required at the nozzle of the injector is provided by a pump and maintained in a cast iron vessel called a rail that feeds each of the injectors in the fuel system. Each injector is individually fired to allow the pressure from the rail to reach the tip of the injector. This high pressure fuel overcomes the spring on a check and exits the injector as atomized fuel into the engine cylinder. Our machine measures the discharge from the injector and the time from the moment the solenoid is commanded to the moment that the discharge is detected.

#### **Machine Features:**

- Accommodates several fuel systems with fixture changeover. Usually takes less than 1 hour for changeover depending on system.
- Injector fixtures have individual water jackets that are closed loop, temperature controlled on exit temperature.
- Machine logs all test results to local hard drive as well as transmitting through RS-232 port.
- All filters have two stage differential pressure switches to provide an early warning of filter failure.
- Automatic plant fill circuit, refills the Viscor tank from a plant feed, when the tank becomes low.
- Calibration fluid to the injector is temperature controlled to  $\pm 1$  degree C in the range 27-80 Celsius.
- Test chamber drip pan and machine base drip pan contain any fluid that may leak during operation or maintenance.
- Variable speed 40 HP drive motor to pump.
- Ideal for product development, but can also be used for durability tests.
- Air conditioned electrical cabinet.



#### **Product Mapping**

In development it is important to make sure that the product will perform as expected under any combination of circumstances that could feasibly occur. The mapping function of this machine allows the operator to select a range of values for several controlled parameters as well as a default value and increment for each. When executed, the machine will run every permutation of these parameters and record the results, generating up to millions of points of data. When graphed appropriately, abrupt changes in the changes graph or discontinuous regions indicate a problem area with the product.

#### **Flexibility**

Our machines are designed so that fixturing can easily be changed out to accommodate new products. In some cases the R&D machines have production capability so that when development is complete, the machine can be useful on the production floor. The R & D areas also like the flexibility to accommodate prototype parts, endurance and audit testing.

We also make versions of this equipment for production use that will tie into your plant operations system. Give us a call to discuss your application!