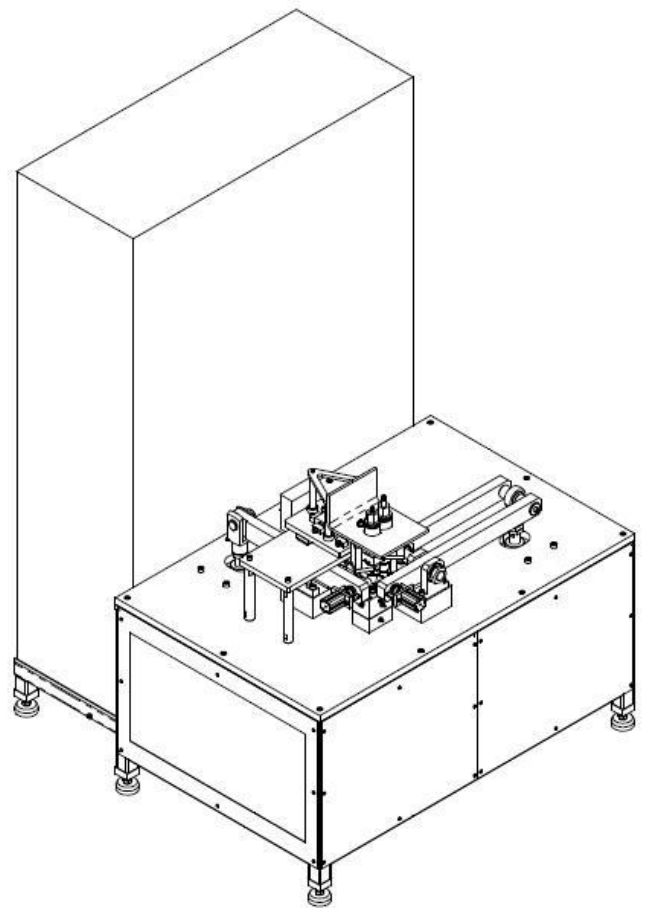


The High-Pressure Direct Injection (HPDI) Dual Injector Tuning Station is designed specifically for the tuning of dual head fuel injector actuators. The test bench allows for testing of the output pressure trace of an injector actuator with two separate heads in parallel, which inject a mixture of diesel fuel and natural gas into a common combustion chamber.

The purpose of the test machine is to first precondition the actuator heads by running each of them through a purge sequence, continuing on to fire one actuator at a time for a particular period, at a predetermined frequency and pulse width, while allowing the operator to mechanically tune the actuator parameters. Each actuator head is fired independently, and the resulting graph from one injection is shown as a Pressure vs. Time trace. As the operator adjusts the actuator parameters, the graph updates in live mode, up to the point where the operator is satisfied with the response, and can complete the tuning for each actuator head. Viscor 1487 is used as a standard diesel fuel replacement test fluid.

At the heart of the test bench is dual DC voltage power supply, linked to an arbitrary waveform generator, which is used to power the actuator being tested. An air piston pump with a high pressure intensification ratio is used to supply a pressure-controlling regulator, which in turn supplies the fuel pressure to the injector. A single-tube helical coil heat exchanger is used for thermal conditioning of the test fluid to a very tight tolerance. The injector under test sprays the fuel and gas mixture through a custom fixture into a measurement circuit. The measurement circuit monitors the discharge flow rate, while at the same time measuring and recording all relevant parameters.

The test stand is managed by a PC-based control system, with an industrial touch screen monitor, keyboard and mouse interface. Along with the onboard data acquisition system and the custom ATA Engine Component Test Software, it allows for control, acquiring, monitoring and logging of all analog and digital input and outputs.



DISCLAIMER

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All specifications can be customized to specific customer requests.

Please contact ATA for additional information or questions regarding your application.

Typical Test Stand Specifications

TEST BENCH	
Footprint (L x W x H)	1.4m(55") x 1.3m(51") x 2.0m(78")
MAIN INJECTOR DRIVE	
Primary Power	20A @ 30VDC (600W)
Boost Power	600mA @ 100VDC (600W)
Frequency	0 - 100Hz (0 - 100% Duty Cycle)
DIESEL FUEL TEST MEDIUM	
Fluid	Viscor 1487
Volume	40L (11gal)
Temperature Control	20°C ±1°C (68°F ±2°F)
Filtration	10µm
SUPPLY PARAMETERS	
Inlet Pressure [Gauge]	3.5 - 300BAR (50 - 4350psi)
Inlet Pressure Accuracy	±0.25% of Full-Scale Range
MEASUREMENT PARAMETERS	
Discharge Pressure	1 - 170BAR (15 - 2500psi)
Discharge Pressure Frequency Response	250Hz (4ms)
Discharge Pressure Accuracy	0.014BAR (200mpsi)
Viscor Flow Rate [Mass]	0 - 20kg/hr
Viscor Flow Rate Accuracy	±0.10% of Full-Scale Range
Temperature	0 - 200°C (32°F ±392°F) 3-Wire RTD
Temperature Accuracy	±0.20% of Full-Scale Range

OPTIONS SELECTED

- ✓ Custom fixture design for simple component under test interface
- ✓ Automatic part clamping using air cylinders
- ✓ Efficient pressure intensification system via unique piston air pump design
- ✓ Bladder-type hydraulic accumulators for pressure storage and pulsation dampening
- ✓ Differential pressure switches to indicate need for replacement of clogged filters

FEATURES

- ✓ Accurate injector supply temperature and pressure control
- ✓ Simple control of injector output frequency, pulse-width and number of shots to fire
- ✓ High frequency response trace of injector output pressure
- ✓ Mass flow measurement of injector output
- ✓ Automatic machine safety shutdown on alarm

RESULTS OUTPUT

- ✓ Real-time graphing of injector output pressure
- ✓ Variable sampling frequency measurement of:
 - Supply Pressure & Temperature
 - Discharge Flow Rate
- ✓ Logging of all relevant header information (i.e. time & date, operator, serial & model numbers, test descriptions, etc.)

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