

HA290/HA123/HF491



# HA290/HA123/HF491

The Injector Calibrator HA290, HA123 Test Stand and the Mobile Test Unit HF491 are three key pieces of test equipment which have been designed specifically for the Cummins PT Fuel System.

## Injector Calibrator HA290

The Injector Calibrator HA290 was designed and built to provide extremely accurate and rapid testing of all Cummins PT injectors without the need for master injectors. It is a service level calibrator and is fully compatible with test standards and procedures set by Cummins.

### Speed of Operation

The metering cylinder of the Injector Calibrator HA290 permits injector output to be measured accurately over as few as 50 'shots'. The layout of the HA290 is arranged to reduce injector testing time. Features such as simple cam changing, easy access to burnish the injector orifice, automatic injector clamping and sealing together with easily fitted adaptors means that the productivity of the HA290 is unequalled.

### Accuracy

The Injector Calibrator HA290 is fitted with a synchronous drive motor capable of maintaining 1050 rpm within plus or minus 1 rpm. Test oil temperature is maintained to within plus or minus 1° Fahrenheit, injector clamping pressure is controlled at 74 or 12 psi., within a tolerance of 1 psi., test oil pressure is automatically controlled at 100 psi., with a tolerance of 0.25 psi.

### Versatility

The HA290 has the capability to accept any type of Cummins PT injector, changes of cams, adaptors and stem extensions to handle different injectors in a simple and speedy operation. The easily changed cam is mounted vertically, and a transparent cambox lid enables rapid identification of the type of cam fitted. Two purpose built tool boxes are conveniently positioned and are provided with clips and brackets to stow tools, adaptors and stem extensions. The left hand box contains the cams, box spanner and 'T' bar, the right hand box contains the injector adaptors and stem extensions.

### Servicing

Test oil and filters are easily changed, and an audit kit HB164 is available to enable operators to verify and maintain the accuracy of the Injector Calibrator HA290.

## Main Features

- Automatic injector clamping
- Easily fitted adaptors and stem extensions (links)
- Positive displacement metering

## Benefits

- Eliminates master injectors
- Very rapid and accurate testing of Cummins PT Injectors
- Correlates to factory standards
- Rapid cam changing
- Rapid interpretation of results
- Approved by Cummins

### TECHNICAL SPECIFICATION

<b>Injectors which can be calibrated</b>	<ul style="list-style-type: none"><li>● 5/16" PT flanged (J&amp;C engines)</li><li>● 3/8" PT flanged (H and NH engines)</li><li>● PTB</li><li>● PTC</li><li>● 5/16" PTD</li><li>● 3/8" PTD and Top Stop PTD</li><li>● K-PTD</li></ul>
<b>Camshaft Drive Motor</b>	1.5 hp synchronous motor, totally enclosed fan cooled, direct on line starting with overload protection. Running speed 1800 rpm at 60 Hz or 1500rpm at 50Hz. The drive is by means of a timing belt and toothed pulleys on the motor and camshaft. The ratio of the pulleys is such that the camshaft has a running speed of 1050rpm.
<b>Test Oil and Service Hydraulic System</b>	
<b>Tank</b>	Thermistor, sludge compartment with magnetic filter bar, sight glass, drain point.
<b>Filter</b>	Totally submerged pleated paper filter having 15 micron absolute filtration.

## TECHNICAL SPECIFICATION CONTINUED

<b>Injector Location &amp; Adaptors</b>	
<b>Cylindrical Injectors</b>	Ring adaptors and links are provided for all types of cylindrical injectors.
<b>Flanged Injectors (N-NH, J &amp; C)</b>	Two piece ring adaptors are supplied for 5/16" and 3/8" flanged injectors. The ring which engages the clamp plate is common on both sizes. A link is supplied which is used with both sizes of flanged injector. A drain pipe assembly is supplied which fits both sizes of injector and is used to direct the drain flow into the test stand top tray.
<b>Metering System</b>	Positive piston displacement metering system with dial indicator display of injector output. Injector output is measured over 50 whole injections.
<b>Capacity</b>	500cc/1000 shots: (1cc/1000 shots – 1mm <sup>3</sup> /stroke)
<b>Resolution</b>	±0.1cc/1000 shots
<b>Readability</b>	±0.1cc
<b>Instrumentation</b>	
<b>Test Oil Temperature Meter</b>	Red - Too cold or too hot Green 104° ± 1°F
<b>Hours Counter</b>	Fuel Pump Motor Running Hours
<b>Injector Output</b>	0.500cc (mm <sup>3</sup> /stroke)
<b>Digital Display</b>	0.1cc Divisions
<b>Deadweight Pressure Control Valves</b>	Three valves to generate pressures of 100, 74 and 12 psi are used as follows:
<b>100psi</b>	Injector fuel supply
<b>74psi</b>	PT Injector clamping force
<b>12psi</b>	Not normally used
<b>Injector Sealing and Clamping</b>	The injector is held horizontally in the test stand. A dual piston clamp head assembly provided independent sealing and clamping loads on the injector body and plunger respectively.

## Additional Accessories

Kit P/Nbr	Description	Use
YDB436	0.248° Cam/Accessory Kit	88NT
YDB437	0.272° Cam/Accessory Kit	91NT/L10
YDB438	0.426° Cam/Accessory Kit	K
HK860	EUI Kit	N14/L10/M11 (Celect)*
HB164	Audit Kit	

\*See HA290.03 below.

## Ordering

The Injector Calibrator HA290.02 is supplied complete with kits HF723, HF725, HF726, HF729 and HS093.

The Injector Calibrator HA290.03 is supplied complete with kits HF723, HF725, HF726, HF729, HS093, YDB438 and HK860 (works fitted).

Kit P/Nbr	Description	Use
HF723	0.169 Cam & 0.230 Cams	3/8" top stop PTD injectors
HF725	Accessory Kit	5/16" & 3/8" PTB, PTC, PTD & 3/8" top stop PTD Injectors
HF726	Accessory Kit	K & PTD Injectors
HF729	Accessory Kit	H. NH, J & C Injectors
HS093	Two Year Spares Kit	HA290 Calibrator

### Cooling Water Supply

Minimum Inlet Pressure 2.8kg/cm<sup>2</sup> (40 lbf/in<sup>2</sup>)

Maximum Inlet Temperature 27°F (80°F)

### Electrical Supply

3 Phase 208-250V 50/60Hz (26 amps max)

3 Phase 380-480V 50/60Hz (12 amps max)

## Shipping

**Gross Weight:** 456 kgs

**Nett Weight:** 376 kgs

**Case Size:** 126 x 93 x 166 cms

# Test Stand HA123

The HA123 Test Stand tests all Cummins PT pumps including the high flow KV12 and KV16 types (with an optional adaptor kit HF016). The HA123 Test Stand also incorporates features that enable A.F.C. pumps and pumps fitted with aneroid valves to be tested. To comply with latest standards, the flowmeters are calibrated to the current Cummins test oil specification.

## Speed of Operation

Testing Cummins PT pumps on the HA123 is simple and fast. Everything about this test stand has been designed for operator convenience and speedy testing.

## Accuracy

The digital, easy to read tachometer, flowmeters and gauges, together with close control of the test oil temperature ensures accurate test results.

## Versatility

The HA123 Test Stand is supplied complete with all the necessary attachments to test the great majority of Cummins PT pumps.

## Servicing

Maintenance is easy, the filters and test oil can be replaced in a very few minutes, there is only one greasing point.

# Main Features

- Infinitely variable speed range of 450 to 4200 rpm
- Dual scale flowmeter
- Fitted with air flowmeter
- Digital tachometer

# Benefits

- Test all types of Cummins PT pumps
- Will test pumps fitted with A.F.C. and aneroid valves
- Approved by Cummins

## TECHNICAL SPECIFICATION

<b>Motor</b>	4kw (5hp) 3 Phase 50 or 60Hz with direct on starting. Motors for use outside the UK are wound for series – parallel operation to cover the widest possible voltage range.
<b>Speed Range</b>	450-4200 rpm.
<b>Variable Speed Gear</b>	<b>Hartridge™</b> patented expanding pulley type, with single drive belt. Efficiency approximately 90% over full speed range.
<b>Shaft Bearings</b>	Ball bearings; pre-lubricated and sealed.
<b>Tachometer</b>	
<b>Digital</b>	Accuracy +/-1 rpm over full speed range. Up-dates every 1/2 sec.
<b>Gauges</b>	
<b>Gear Pump Suction</b>	4 inch diameter 0-30 inches Hg
<b>Resilient Mounting</b>	Accuracy +/- 0.2%.
<b>Gear Pump Pressure</b>	3 inch diameter 0-800 lb/in <sup>2</sup> . (0-40 kg/cm <sup>2</sup> ) accuracy 0.5%.
<b>Fuel Temperature</b>	3 inch diameter; 50-150°F (10-65°C).
<b>Manifold Pressure</b>	6 inch diameter 0-400 psi.
<b>Air Pressure</b>	6 inch diameter 0-30 lb/in <sup>2</sup> . resilient mounting Accuracy +/- 0.2%.
<b>Flowmeters</b>	Continuous reading, dual scale, glass main flowmeter; individually calibrated 75 to 630 lb/hour and 600 to 2401 lb/hour; total scale length approx. 36 1/2 inches. Accuracy +/- 1%. Secondary glass flowmeter for throttle leakage; calibrated 75-750 cc/minute; scale length approx. 8 1/2 inches. Air flowmeter for measuring thread leakage.
<b>Fuel Tank</b>	5 Imperial gallons (22.5 litres) capacity; with 1 kw heater.
<b>Temperature Control</b>	Fuel temperature automatically controlled within +/- 2°F by electric heater and unique contra-flow water cooling system.
<b>Fuel Filters</b>	
<b>Main filter</b>	Disposable.
<b>Table drain</b>	Fine mesh.
<b>Writing Desk</b>	Right hand or left hand fitting with paper retainer.
<b>Electrical Supply</b>	3 Phase 208-250V 50/60Hz 3 Phase 380-480V 50/60Hz

# Additional Accessories

Each HA123 Test Stand is supplied complete with all necessary accessories for testing the great majority of Cummins PT pumps, including AFC pumps and pumps fitted with aneroid valves. A side mounting bracket is available if required.

## Ordering

The HA123.01 Test Stand for Cummins PT pumps 5hp, 3 phase motor, complete with heater, cooler, pump mounting bracket for side mounting and accessories.

- HF016 Fitting kit to facilitate testing of KV16 pumps
- HS069 Two year spares kit

## Shipping

**Nett Weight:** 336 kgs

**Gross Weight:** 410 kgs

**Case Size:** 104 x 71 x 188 cms

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## Mobile Test Unit HF491

The Mobile Test Unit HF491 enables workshops to test Cummins PT pumps on existing test stands as long as it meets the necessary power and speed requirements. The HF491 will handle the latest higher flow rated Cummins pumps such as those fitted to the 'K' range engines. The Mobile Test Unit HF491 includes all of the essential features of the HA123 Test Stand. A comprehensive range of brackets and couplings are available to enable the HF491 to be used with most **Hartridge™** and other test stands. The Mobile Test Unit HF491 can also be supplied with an optional Aneroid/AFC Test Unit HF109 which is recommended for normal use.

### Speed of Operation

The Mobile Test Unit HF491 is easily manoeuvred on its nylon castors to wherever it is needed. It also has its own self contained test oil tank, which permits testing of Cummins PT pumps without the need to change the test oil used in the test stand.

### Accuracy

The fuel system incorporates a heater and cooler which ensures close control over test oil temperatures and hence accuracy and repeatability of test results.

### Versatility

The HF491 is supplied complete with accessories including a pump bracket, ready for immediate use on **Hartridge™** test stands.

When used with other mounting manufacturers' test stands a pump mounting plate HM922 is available as an additional accessory, which can be adapted to the standard pump mounting bracket supplied with the test stand.

### Driving Motor

Some Cummins PT pumps are tested at speeds of around 3500 rpm, it is therefore essential that the driving test stand be capable of providing sufficient power at these speeds. As a general guide, the test stand driving motor should be a minimum of 5hp with a drive gear efficiency approaching 90% at the required speeds.

### Servicing

Maintenance is simple, the filters and test oil can be replaced in minutes.

## Main Features

- Uses an existing test stand to drive the Cummins PT pump
- Will test all Cummins PT pumps
- Supplied complete with accessories for use with a **Hartridge™** Test Stand
- Fitted to a mobile storage base

## Benefits

- Extends the utilisation of an existing test bench
- Affordable solution for testing Cummins PT pumps
- Maximises the use of available space

## TECHNICAL SPECIFICATION

<b>Vacuum Gauge</b>	
<b>Gear pump suction</b>	4 inch diameter, 0-30 inches.
<b>Hg</b>	Accuracy +/- 0.2%
<b>Pressure Gauges</b>	
<b>Gear pump pressure</b>	3 inch diameter, 0-800 lb/in <sup>2</sup> . Accuracy +/- 1.5%
<b>Manifold pressure</b>	6 inch diameter, 0-400lb/in <sup>2</sup> . Accuracy 0.25%
<b>Thermometer</b>	3 inch diameter, 50-150°F (10-65°C).
<b>Main Flowmeter</b>	Continuous reading, dual scale glass flowmeter, individually calibrated.75-620lb/hour and 600- 2400lb/hour; total scale length approx. 36 1/2, inches; accuracy +/-1% Plumb-bob level indicator.
<b>Secondary Flowmeter</b>	For throttle-leakage. Glass scale, calibrated 10 to 760cc/min; scale length approx. 8 1/2 inches.
<b>Fuel System</b>	The unit contains its own independent fuel system.
<b>Fuel Tank</b>	4 1/2 imperial gallons capacity (20.5 litres), fuel inlet and fuel outlet connection; separate fuel filter connection; drain cock; external fuel level sight glass.
<b>Temperature Control</b>	Fuel temperature is automatically controlled to 90°F +/- 2°F by 1 kW electric heater and contra-flow water cooler.
<b>Mobile Trolley</b>	Fitted with four large, swiveling nylon castors and complete with accessories tray to hold pipes, pumps, and tools.
<b>Electrical Supply</b>	Single Phase 110V 60Hz Single Phase 220V 60Hz Single Phase 220V 50Hz

## Additional Accessories

- APB28 Bracket Assembly (for testing with **Hartridge™** Series 875, 1100, 2500, AVM/PGM Test Stands)
- APB19 Bracket Assembly (for testing with **Hartridge™** Series 550, 600 Test Stands)
- HF109 Aneroid/AFC Test Unit
- HS074 Two year spares kit
- HF012 Spline Drive Kit
- HM922 Pump mounting plate for use with other manufacturers' test stands

## Ordering

The Mobile Test Unit HF491.01 is complete as per specification.

N.B. Available in three different electrical supplies;

Single phase 110V 60 Hz

Single phase 220V 60 Hz

Single phase 220V 50 Hz

## Shipping

**Gross Weight:** 137 kgs

**Nett Weight:** 83 kgs

**Case Size:** 185 x 66 x 68 cms

Contact your local **Hartridge™** distributor  
for more detailed information or visit

[www.hartridge.com](http://www.hartridge.com)



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