

HARTRIDGE 2500



10/15 H.P.

DIESEL FUEL PUMP TEST STAND



HARTRIDGE

SETTING THE STANDARDS FOR DESIGN

Now in operation world-wide, the Design Award winning Series 2500 has set the standard for test stand design. Once installed in a workshop, the 2500 quickly becomes the favourite of the operators – no more open topped test tubes with their attendant inaccuracies and delays, no more gear changing and speed instability problems or transmission servicing. Instead with the 2500, we have an up-to-date 10 or 15hp T.C.E. pre-selectable gearless drive and positive displacement metering. These features combine with superb layout and accessibility, to give a test stand which is a pleasure to operate and which will quickly repay your investment in increased productivity and accuracy. In fully meeting the ISO 4008 standard which was established by a team including Bosch, Lucas CAV and Hartridge engineers, the output of all makes of pump tested on the 2500 will correlate accurately with the test standards demanded by diesel fuel pump manufacturers.

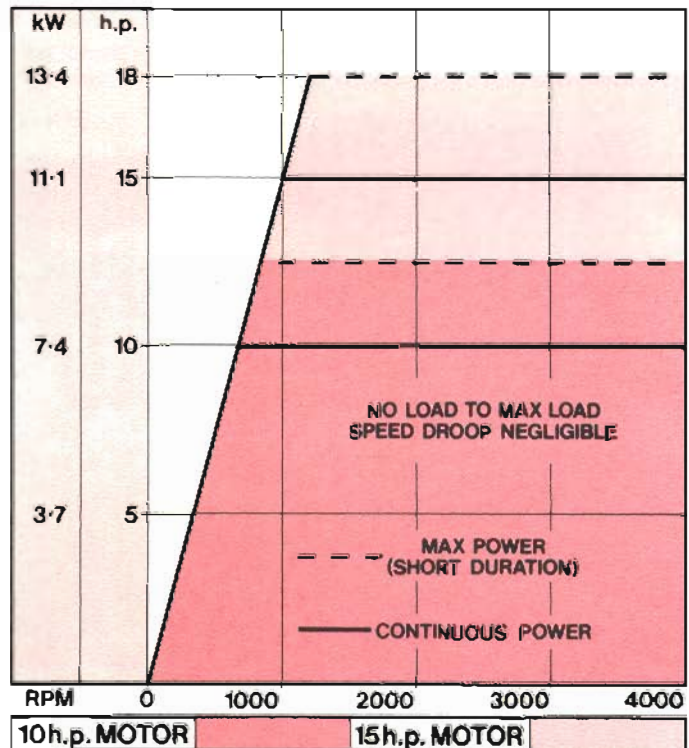
VALUE FOR MONEY

Time saving features like positive displacement metering add to the cost of making a test bench. In many cases however the cost of 2500 is similar to older designs which retain for example, a simple test tube calibrator. When you also include the pump mounting brackets and accessories, test injectors and anti-backlash coupling which are included in the 2500's price, who can doubt the value for money built-in and supplied with every Hartridge 2500 test stand.

FULL PRODUCT SUPPORT

Hartridge exist to supply fuel injection test equipment. It follows that Hartridge machines must be truly universal in application and not designed with one make of pump in mind.

Hartridge products are backed by more than 80 agents world-wide, fully equipped training facilities, qualified service engineers and detailed, fully illustrated operating and servicing manuals and catalogues.



POWER TO COVER PRESENT AND FUTURE NEEDS

By eliminating a transmission system, the 2500's T.C.E. drive permits the rated power of the motor to be available at the coupling without power loss. This means that the standard machine has the power to test most known automotive pumps up to 12 cylinders. For diesel specialists who see a requirement to test exceptionally large pumps, a 15hp continuously rated motor is available as an option.

The large flywheel is directly coupled to the pump drive, and for safety, is positioned behind the fascia panel.

CALIBRATION TIMES REDUCED BY UP TO 70%

The unique Hartridge Piston In Graduate (P.I.G.) positive displacement calibration system offers the following advantages over conventional open topped test tubes:

- IMPROVED READABILITY
- NO DRAINING TIME
- NO SETTLING TIME
- GREATER OVERALL ACCURACY
- REDUCED SHOT COUNT NECESSARY TO ACHIEVE I.S.O. 4008 ACCURACY

These features can give:
UP TO 70% SAVING IN CALIBRATION TIME



HARTRIDGE

RAPID TEST INJECTOR CHANGE

All known types of test injectors can be easily and rapidly clamped into the compact injector mount. This is supported by a cantilevered swinging arm which permits clear and unobstructed access to the pump from both sides of the test stand.

Clamping and sealing the injector into the mount ensures that there is no health hazard due to the release of fumes.

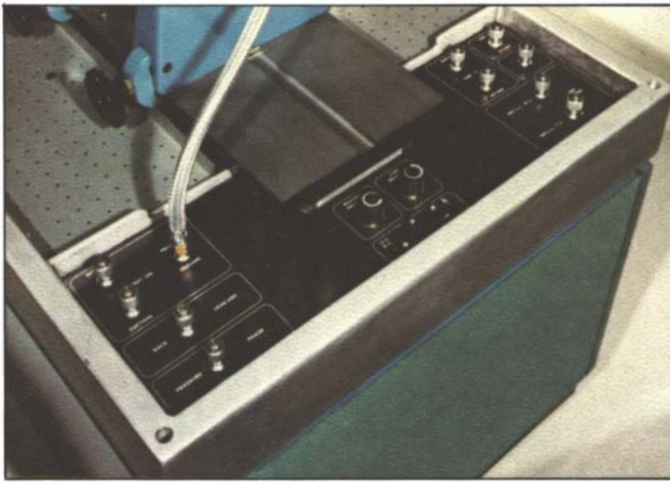


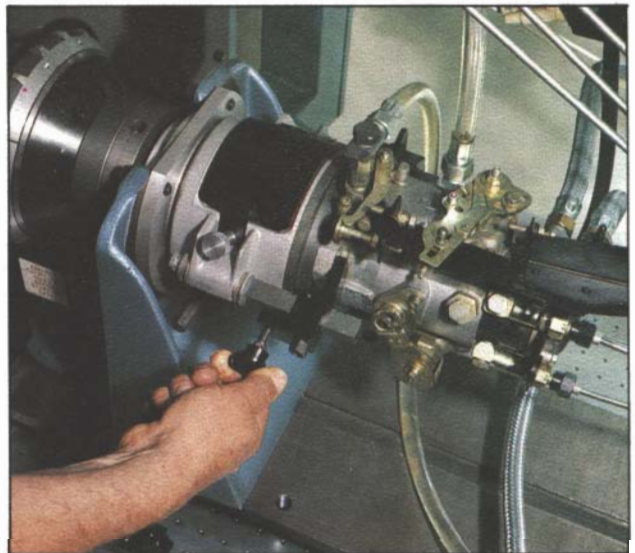
TABLE MOUNTED CONNECTIONS

All test oil, lube oil and low voltage D.C. supplies are grouped together in an easily accessible position at the front of the large self draining table. With the elimination of a transmission system, servicing requirements for the 2500 are substantially reduced. Ample access is provided for routine servicing and all fluid tanks are fitted with drain pipes and sightglasses.

SIMPLIFIED DISTRIBUTOR PUMP ATTACHMENT

To enable the rapid fitting of distributor pumps to the 2500, Hartridge has introduced a new design of attachment kit together with a range of supporting accessories. Pumps are attached using two hand operated clamps on to a sliding sleeve, which is locked over a housing at a position to suit the length of the pump drive shaft. Safety is assured with the sleeve and housing totally enclosing the flex coupling and drive adaptors.

The basic bracket and sliding sleeve is supplied with the test stand. To mount a pump optional kits must be ordered. Illustrated is kit HF557 which enables all C.A.V. DPA, DPC, DPS and Bosch, Diesel Kiki and Nippon Denso EP.VA/VE pumps to be mounted, using just this one kit.



2500 FEATURES

- 12 CYLINDER PISTON IN GRADUATE CALIBRATION
- 10 OR 15HP T.C.E. PRE SELECTABLE GEARLESS DRIVE
- BUILT-IN LUBE SYSTEM
- BACK LEAKAGE FLOWMETER
- NEGLIGIBLE NO LOAD TO LOAD SPEED DROOP
- SWIVELLING CONTROL CONSOLE/ CALIBRATOR
- QUICK RELEASE INJECTOR MOUNT
- COMPLIES FULLY WITH I.S.O. 4008 STANDARDS
- SUPPLIED WITH 12 TEST INJECTORS, BASIC INLINE AND ROTARY PUMP MOUNTING BRACKETS, ACCESSORIES AND ANTI BACKLASH COUPLING
- OPTIONAL ELECTRONIC PHASING
- OPTIONAL 8 CYLINDER VIDEO METERING CALIBRATOR



2500



DESIGNED FOR THE OPERATOR

The new swivelling calibrator head houses all the controls and instruments required for pump testing. A flow meter is used to give more accurate and instant measurement of rotary pump 'back leakage'. The calibrator head also houses the P.I.G. metering system.

The optimised layout of all controls and instruments, further reduces the operators work load.

ELECTRONIC PHASING

An entirely new design of electronic phasing can be specified for the 2500. Phase angle is presented digitally and the system retains the standard rapid injector change facility, as the sensors are not disturbed.

PUMP SPEED SETTING TIMES REDUCED BY UP TO 40%

The drive system of the 2500 incorporates a test speed pre-selection facility. This plus a 500 rpm/sec rate of acceleration and deceleration, gives up to 40% time savings over typical pump testing cycles. A rotary selector allows pump test speeds to be quickly pre-set, up to a maximum of 4000 rpm. If set for example at 2000 rpm and the start button pressed, the drive will accelerate to within ± 1 rpm of the pre-set speed in 4 seconds. Pressing the stop button activates a regenerative braking system to stop the drive – also in 4 seconds from 2000 rpm. There is no speed droop from load to no load with this drive system. This gives greater overall testing accuracy, and faster more accurate setting of governors.



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SPECIFICATION

DRIVE	7.5kW (10hp) or optional 11kW (15hp) Thyristor controlled variable speed drive. Full overload protection against low voltage, phase loss and overrating.
Speed Range:	Output shaft speed range of 40-4000 rpm in both directions, in one range
Speed Control:	Fully closed loop speed control system with integral control giving zero steady-state droop. Speed selection by coarse and fine rotary potentiometer. Acceleration rate of 500 rpm per second, to pre-set speed at the press of a button Press button regenerative braking from set speed, giving deceleration rate of 500 rpm per second
Flywheel:	Inertia - 0.45kgm ² (11.0 lbfm ²) ISO rating - 315mm ³ /stroke at 550 rpm
Drive Shaft Stiffness:	15,400Nm/ ² ISO rating - 550mm ³ /stroke.

FUEL SYSTEM

Test Oil Supply and Controls:	Pump for test oil supply driven by a 1.1kW 3-phase motor with direct on starting and overload protection against low voltage and overrating. Remotely operated variable pressure servo-valve controlling from vacuum to +3 bar (45 psi) at a flow rate of up to 500 l/hr (110 gals/hr) with a typical stability of less than 0.14 bar (2 psi). Pressure phasing control valve with integral shut-off valve giving a variable pressure from 5 to 50 bar (75 to 750 psi).
Tank:	45l (10 gals) working capacity with 'sight glass' and drain pipe. Easily accessible for topping-up and cleaning
Temperature Control:	Electronically operated temperature control linked to an oil/water heat exchanger and a 2.5kW tank heater. Water consumption 3l/min (0.6 gal/min) at maximum rated heat extraction of 3kW (approx) with an oil/water temperature difference of 20°C. Proportional control with dead-band ensures temperature holding accuracy of better than ±2°C and minimal water or heat consumption. Long life solid state relays for switching heater and cooler solenoid. The temperature is set on a rotary potentiometer with a pre-set position of 40°C ±2°C and variable from 25°C to 45°C
Lube Oil Supply:	Single pump for lube oil supply driven by the fuel system motor. Control valve with integral shut-off valve providing variable pressure from zero to 5 bar (75 psi) at a flow rate of at least 250l/hr (55 gals/hr).
Calibration System:	Patented Piston-in-Graduate positive displacement metering system, fitted with 12 0-60cm ³ graduates. Flowmeter for back leakage measurement calibrated from 15-1200cm ³ /min on ISO 4113 test oil at 40°C

INSTALLATION REQUIREMENTS

ELECTRICAL SUPPLY:

10hp	380/420V 50Hz 3-phase or 440/480V 60Hz 3-phase 30A maximum rating.
	208/240V 50Hz 3-phase or 208/240V 60Hz 3-phase 60A maximum rating
15hp	380/420V 50Hz 3-phase or 440/480V 60Hz 3-phase 50A maximum rating
	208/240V 50Hz 3-phase or 208/240V 60Hz 3-phase 80A maximum rating.

COMPRESSED AIR:

90 psi minimum with nominal flow.

WATER:

Approximately 135l/hr (30 gals/hr) according to water temperature and pressure.

ORDERING

RANGE OF MODELS:

HA 2500.01	Standard Model to above specification.
HA 2500.02	Standard Model plus Dynamic Phasing.
HA 2500.03	Standard Model with low pressure supply system and gauge.
HA 2500.04	As model HA 2500.03 plus Dynamic Phasing
HA 2500.05	15hp main motor without phasing.
HA 2500.06	15hp main motor with Dynamic Phasing
HA 2500.10	VDM Model. Basic machines to above specification, but fitted with Video Display Metering (VDM) Calibrator and Printer in place of Piston in Graduate Metering

(For more information on the HA 2500.10 see leaflet Ref. No. VDM)

Shot Count: Electronic shot count with pre-selected counts of 50, 100, 200, 300, 500 and 1000 turns. Additional facility for manual start and re-set of count.

INSTRUMENTATION

Tachometer:	4-digit 7-segment LED display accurate to ±1 rpm. Updates every 0.5 seconds.
Fuel Supply:	100mm (4 ins) dia. calibrated -1 bar to 0 to +4 bar, and 30in Hg to 0 to 60 psi.
Auxiliary 1:	100mm (4 ins) dia. calibrated 0 to 7 bar and 0 to 100 psi.
Auxiliary 2:	100mm (4 ins) dia. calibrated 0 to 14 bar and 0 to 200 psi.
Phasing Pressure:	75mm (3 ins) dia. calibrated 0 to 70 bar and 0 to 1000 psi.
Lube Oil Supply:	75mm (3 ins) dia. calibrated 0 to 7 bar and 0 to 100 psi.
Temperature:	Digital temperature indication in °C provided on tachometer display. Resolution 0.1°C accuracy ±0.25°C at 40°C. Temperature 'in range' lamp providing indication of ±2°C of desired temperature.

INJECTOR MOUNT

Quick Injector change with standard adaptors for 'S' and 'T' size injectors. The mount will also accommodate ISO Orifice Plate Injectors and engine injectors with suitable adaptors. Test Bench fitted with 12 ISO vented holders, edge filters and ISO 4010 nozzles as standard.

PHASING

Pressure standard. Electronic with digital display of phase angle optional.

AUXILIARIES

DC supply for injection pump solenoid operation (max. 3 amps).
Multi-Pin socket for connection of external calibrator and equipment (110V).
Hours counter for scheduled maintenance.

ACCESSORIES

All Testbench Standard models are supplied with quick action pump clamps, basic flange brackets, two base mounted pump brackets and accessories for base mounted pumps of 38mm, 45mm and 50mm centre height including 'A', 'AA', 'B', 'N', 'NN' and 'M' types. Also included is an anti-backlash coupling and coupling guards.

PUMP ATTACHMENTS

Examples of Pump Attachments which are available for the Series 2500 Test Stand:
HF 483 - Bosch base mounted 'P' size.
HF 404 - Flange mount Bosch (68mm spigot) - 4 hole fixing.
HF 414 - Flange mount Bosch (68mm spigot) - 3 hole fixing.
HF 557 - CAV, DPA, DPC and DPS, Bosch, Diesel Kiki, Nippon Denso - EP VA/VE.
HF 559 - Stanadyne DB2.
HF 572 - Stanadyne DM.
HF 579 - Stanadyne D, DB, JDB and DC.
APB 154 - Table adaptor for Bosch supplied brackets. (This option is illustrated on the front cover)

SHIPPING

PACKING CASE: 1910 (75") x 1020 (40") x 2040 (80")

NET WEIGHT: 790kg (1750 lbs)

GROSS WEIGHT: 950kg (2100 lbs)

