



TEST EQUIPMENT

MARINE / HEAVY-DUTY



DISCOVER DIESEL EXCELLENCE



The Merlin **DC 80-EM** is a low profile test stand, designed principally for the calibration of larger, single cylinder fuel injection pumps found in marine, rail and heavy-duty industrial applications. The DC 80-EM has flywheel, inertia and drive specifications, tailored to suit customer requirements.

Model **DC 80-EM** incorporates the Merlin S600M/20 positive displacement metering unit, replacing graduates fitted to the standard unit. Monitoring and measuring in bar graph and numeric format on a 10" monitor. Input/output data and the control of the measuring system is either by touch screen menu or soft touch push button switches.



APPLICATIONS

- MPU 300-1 uprated cambox for W46/ZA40S size/type pumps (300mm).
- MPU 300 general purpose heavy-duty cambox, generally for up to 35 mm test cam lift (300mm).
- MPU 50 for EDM, Woodward, Caterpillar 3500 EUI & MUI, Volvo, Scania, Iveco EUI (125mm or 175).
- MPU 45 for L'Orange, Ruston, Woodward and Allen unit injectors (175mm).
- MPC175 1, 3 or 4 cylinder cambox with maximum 24mm test cam lift (175mm).
- CAT 3600 special production cambox for Caterpillar 3600 mechanical unit injector.
- Can cater for up to 50mm cam lift and 50mm plunger diameter units.

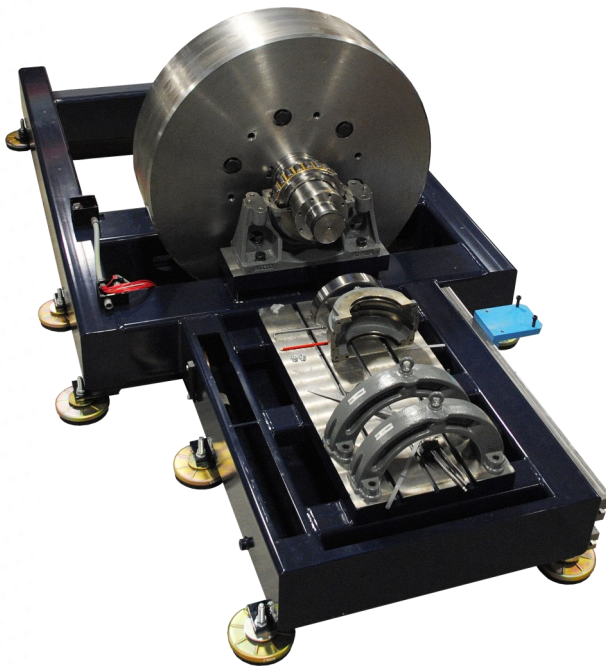
A unique robust heavy-duty design weighing 5080kg, the DC 80-EM gives the customer multiple options to meet the challenges of testing industrial size bucket and roller type pumps.

Marine engines are some of the largest engines in the world, but like all engines, they must be maintained to the correct specifications.

As the pump on any diesel engine is a critical component, its test and repair is essential to keep a marine vessel powered. The DC-80 is the solution that makes this happen.

At an impressive 5 tonnes in weight, it has the ability and stability to handle the largest marine pumps.

The flywheel alone is a huge 2300kg with an inertia rating of 270 kgm² meaning it has the resistance to turn any size of pump.



DRIVE MOTOR:	110hp (82kw)
SPEED RANGE:	30-600 rpm
DISPLAY:	S600M/20 Measuring system 10" TFT Colour display
MEASURING RANGE:	50-20,000 mm ³ /stroke
TEST OIL SUPPLY PUMP:	1320 litres/hr
LUBE OIL SUPPLY PUMP:	363 litres/hr
TEST OIL FEED PRESSURE:	0-9 bar
FLYWHEEL:	2300kg, 270 kgm ²
FLOWMETER:	2-22 litres/min
TACHOMETER:	Digital display, accuracy ± 1 rpm with 0.5 seconds update
WATER SUPPLY:	750 litres/hr min 3 bar required
TEMPERATURE CONTROL:	0-60°C ±1°C at 40°C
ELECTRICAL SUPPLY:	220v/ 3 Phase/ 60Hz (customer specification) 400v/ 3 Phase/ 50Hz (customer specification)
CALIBRATION FLUID:	Shell Calibration Fluid 4113, now S9365
WORK TABLE:	300mm Centre Height
DIMENSIONS	
HEIGHT:	1820mm
LENGTH:	3700mm
WIDTH:	1770mm
WEIGHT:	5080kg

S450-1 M

The **S450-1** has been designed to enable the performance testing of larger high-pressure diesel fuel injectors as found in rail, marine and power generation applications.

The **S450-1** is air operated, eliminating technician fatigue and is designed to carry out all standard tests:

- **Nozzle opening pressure**
- **Chatter test (atomization)**
- **Spray pattern**
- **Seat leakage**
- **Back-leak.**



A variable pumping rate allows for critical analysis of nozzle spray form and line pressure can be held to enable stable pressure dry seat testing.

During atomisation, the large illuminated spray chamber with built-in fume extraction offers a clear view of the nozzle tip.

The S450-1 is supplied with a dual scale analogue pressure gauge and the Merlin S500-2 digital display injector opening pressure monitor and integral printer.

The S500-2 has been designed for accurate performance testing, production line testing and quality over checking of diesel fuel injectors and nozzles.

Individual test results can be recorded on the S500-2's built-in printer.

The robust self-draining horizontal work table will accommodate the largest of injectors. Quick release v-clamps secure the injector in the working position and if required, special mountings can be manufactured to customer requirements.

The Merlin S450 is capable of testing some of the largest injectors in the marine industry.

The sheer scale of ocean going vessels is enormous and the power needed to generate propulsion requires a substantial engine and fuel injection system.

Some injectors can be several feet in length and the S450 is easily capable of accommodating these.

**PUMPING UNIT:**

Air operated hydraulic pump unit supplied by normal workshop air supply

PRESSURE RANGE:

0-10000 psi (0-700 bar) or 0-15000 psi (0-1000 bar) depending on model

DISPLAY:

S500-2 Monitor , dual scale analogue pressure gauge

FLOW CONTROL VALVE:

Provides full to minimum flow for critical testing

HIGH PRESSURE TEST PIPES:

M22 x 1.5 M14 x 1.5 other pipes available M24 x 1.5, M27 x 1.5, M30 x 1.5

SPRAY CHAMBER:

Illuminated chamber, safety switch door operation

FUME EXTRACTION:

Variable rate air operated extraction system

FUEL TANK:

100 litres Capacity

FILTRATION:

Replaceable cartridge spin-on element (5 micron rating)

AIR SUPPLY:

6.2 – 6.9 bar required

ELECTRICAL SUPPLY:

220/240v/1PH/50 Hz customer specifications on request

CALIBRATION FLUID:

Shell Calibration Fluid 4113, now S9365.

WORK TABLE:

The standard V-clamps will accommodate T, U and V size

DIMENSIONS**HEIGHT:**

1360mm

LENGTH:

1325mm

WIDTH:

850mm

WEIGHT:

250kg

EM/GM SERIES

The **Merlin EM Series** are a range of test stands designed for the calibration of traditional in-line and rotary fuel injection pumps of various sizes from all main manufacturers.

Available with 20 or 30 bhp drives with 8 or 12 cylinder options.

The EM range can now cater for most manufacturers EUI, inline and rotary units.



The **EM Series** benefits from a highly precise electronic metering system that utilises 8 to 12 individual flowmeters depending on the model.

This is displayed on a 24" LCD monitor.

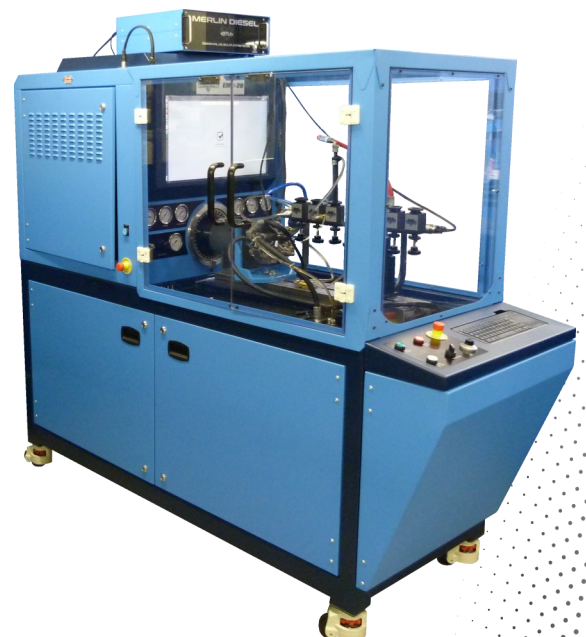
Full training on all the applications can be given at Merlin Diesel HQ and we have a dedicated technical support team which is contactable via video link.

It also has a graduate metering unit the GM series, pictured here.



APPLICATIONS:

- 'A' type Inline BOSCH, SIMMS and MINIMEC.
- Mechanical/Rotary BOSCH, DELPHI, STANADYNE, DENSO and ZEXEL.
- All Makes EUI/EUP Cambox.
- Submersible pumps (appropriate Cambox required).
- Common Rail Pumps and Injectors from BOSCH, DELPHI, CONTINENTAL VDO and DENSO.



The **Merlin S400A** is a 700 bar air operated, automated injector tester used for testing and adjusting conventional automotive injectors. Designed and developed with the following functions:

- Opening pressure
- Chatter test (atomization)
- Spray pattern
- Seat leakage
- Back-leakage



All controls and instruments are grouped together for operator convenience and include the latest Merlin S500-2 display monitor, flow control valve, light and fume extraction control.

Fully sealed air pump unit, robust construction, pneumatically operated via normal workshop air supply.

Illuminated spray chamber to give a clear view of injector spray form. A variable rate air operated fume extraction system with optional Perspex spray arrestor further assists the extraction operation.

Standard tank features include sight level gauge, quick release filler cap and magnetic drain plug.

Fitted with a heavy-duty v-clamp assembly and a M22x1.5 male threaded outlet connector to suit marine injector test pipes available from stock or made to customer specification.

PRESSURE RANGE:	0–700 bar, psi, MPa or kgf/cm ²
TIME RANGE:	0–99.9 seconds
PRESSURE:	±1 bar
TIMING:	±1 second
TRANSDUCER:	±0.1% of full value
LINEARITY:	±1 bar over full range
MEMORY:	Data store/recall for injector type test plans
DISPLAY:	LED, Tick/cross symbols advise user of NOP and back-leak pass/fail
COMPENSATION:	Automatic compensation for variations in test oil temperature
CALIBRATION FLUID:	Shell Calibration Fluid 4113, now S9365
DIMENSIONS	
HEIGHT:	770mm
LENGTH:	600mm
WIDTH:	600mm
WEIGHT:	66kg

The **Merlin MK6** series are designed for the calibration of larger, single and multi-cylinder fuel injection pumps as fitted in marine, rail and heavy-duty industrial applications.

The thyristor—controlled DC motor provides an infinitely variable stepless drive in both directions, with pre-selection of speeds. Zero drop from maximum to minimum load provides an accurate governor setting.

There are two 2.5 Kw heater elements fitted in the test oil tank. Also fitted with a microprocessor-based digital controller with thermo-couple.

A selection of mobile injector mount/calibration units, cam-boxes and fuel pump mounting brackets are available.

Also available with either integral or free standing remote control unit and is fully compatible with Merlin's mobile calibration rig (C415) and injector rig (R415).

INJECTION

Injection is via the R415 Mobile Cylinder Injector Mounting Unit.

- The unit will accept standard 'T', 'S' and orifice plate test injectors for multi-cylinder fuel pumps.
- A heavy-duty damper and valve selector system is incorporated for testing single cylinder fuel pumps.
- Single cylinder test injectors are positioned remotely on a universal fixture mounted on the test bench bed.
- 1000mm³
- 7000mm³
- Electronic shot count unit range 1 to 9999 adjustable in single selectable increments, display indicates decreasing count down.
- Full acoustic enclosure can be provided



The **Merlin H12-30E** Test Stand has been designed principally to test heavy-duty in-line, V or single cylinder diesel fuel injection pumps.

A selection of mobile injector mount/calibration units, cam-boxes and fuel pump mounting brackets are available to enable testing of a variety of pump types. Options are available in 4, 6, 8, 16 and 18 cylinder capacity.

Remote control panel duplicates motor start/stop, shot-count start/drain and speed control only and is designed to locate either side of test bench bulkhead. When plugged into the socket, the relevant controls on the front panel are disabled.



Two 2.5 Kw heater elements fitted in test oil tank. Microprocessor-based digital controller with thermo-couple.

INJECTION

Injection is via the **R series** Mobile Cylinder Injector Mounting Unit.

- The unit will accept standard 'T', 'S' and orifice plate test injectors for multi-cylinder fuel pumps.
- A heavy-duty damper and valve selector system is incorporated for testing single cylinder fuel pumps.
- Single cylinder test injectors are positioned remotely on a universal fixture mounted on the test bench bed.

METERING

Metering is via the **C series Mobile Calibration Unit**.

- Solenoid operated bottom fill/bottom drain graduates.
- The unit has 12 x 0-1000mm³ graduates for multi-cylinder pumps.
- 3 additional graduates as follows for single cylinder pump testing
- 200mm³ / 1000mm³ / 7000mm³
- Electronic shot count unit range 1 to 9999, adjustable in single selectable increments, display indicates decreasing countdown.

S31 M

The **Merlin S31M** is a 700 bar portable hand lever operated injector tester. Used for testing and adjusting conventional marine injectors. Designed and developed with the following functions:-

- Opening pressure
- chatter test (atomization)
- spray pattern
- seat leakage
- Back leakage

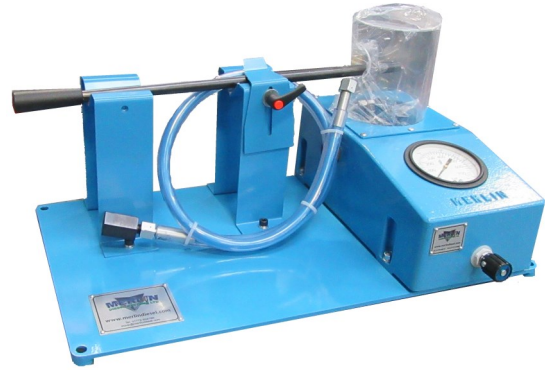
Built-in Perspex spray arrestor provides continuous circulation of test oil with minimum loss to atmosphere.

Pump unit designed to give effortless operation by the incorporation of a fuel pump type element, contained in a replacement cartridge.

Up-rated actuator shaft/bushes and injector mounting supports for larger marine injectors.

Pump output 1600/1800 mm³ per stroke. Trapped volume limited by design to satisfy injector manufacturers back leak test requirements.

Lightweight die cast aluminium body with removable operating handle.



NR3B

The **Merlin NR3B** is an injector needle reconditioning machine capable of accurately grinding needle seat angles to manufacturer's settings. It is suitable for reconditioning all types of nozzles ranging from automotive to rail traction, generator and marine applications.

The following features are incorporated in the NR3B: -

- Independent direct motor drive to work-head: there is no flexible drive.
- Easily replaceable cartridge type extra precision grinding wheel spindle.
- Operative angles 44 to 106 degrees.
- All handles grouped at front and side for ease of operation.
- All moving parts are adjustable to ensure and maintain accuracy.
- Optional cabinet is available, with ample storage space for laps, paste and equipment



The Merlin **Autolap 200** is an injector nozzle seat lapping machine which dispenses with time, consuming hand lapping methods of nozzle reclamation.

A wide range of stone tipped laps are available to service most nozzle sizes from 'S' through to 'V'.

These laps are positioned in a self-centring automatic chuck during the re-seating operation, on completion of which the chuck drive automatically disengages allowing nozzle removal for inspection purposes.

A variable timer control allows for lapping periods of up to 7 minutes in 10 seconds steps. The timer control can be interrupted and restarted during any pre-set period.

Stone tipped lapping tools can be re-dressed on the Merlin NR3B using dressing tool attachment.

Nozzles can be tested on the Merlin S31 or S400 series injector test units.



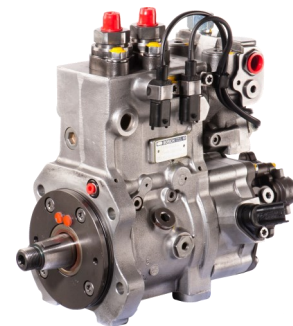
With 75 years of experience, Merlin Diesel Systems is one of the world's leading aftermarket suppliers of diesel fuel injection parts and test equipment.

We are National Diesel Distributors for **Delphi, Denso** and **Stanadyne**, as well as Authorised Distributors for **Bosch, Continental, Perkins** and **Yanmar**.

We hold over £26m worth of stock, including over 7,000 injector, and 19,000 pump part references. In total, we hold over 86,000 product lines all available for next day UK delivery.

Our remanufacturing facility is one of the largest in the world with over 20 OE authorised test benches. Our technicians are all fully qualified and we exclusively use Genuine OE repair parts.

What ever your diesel needs, Merlin Diesel Systems are your trusted partner for fuel injection and engine management solutions.



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