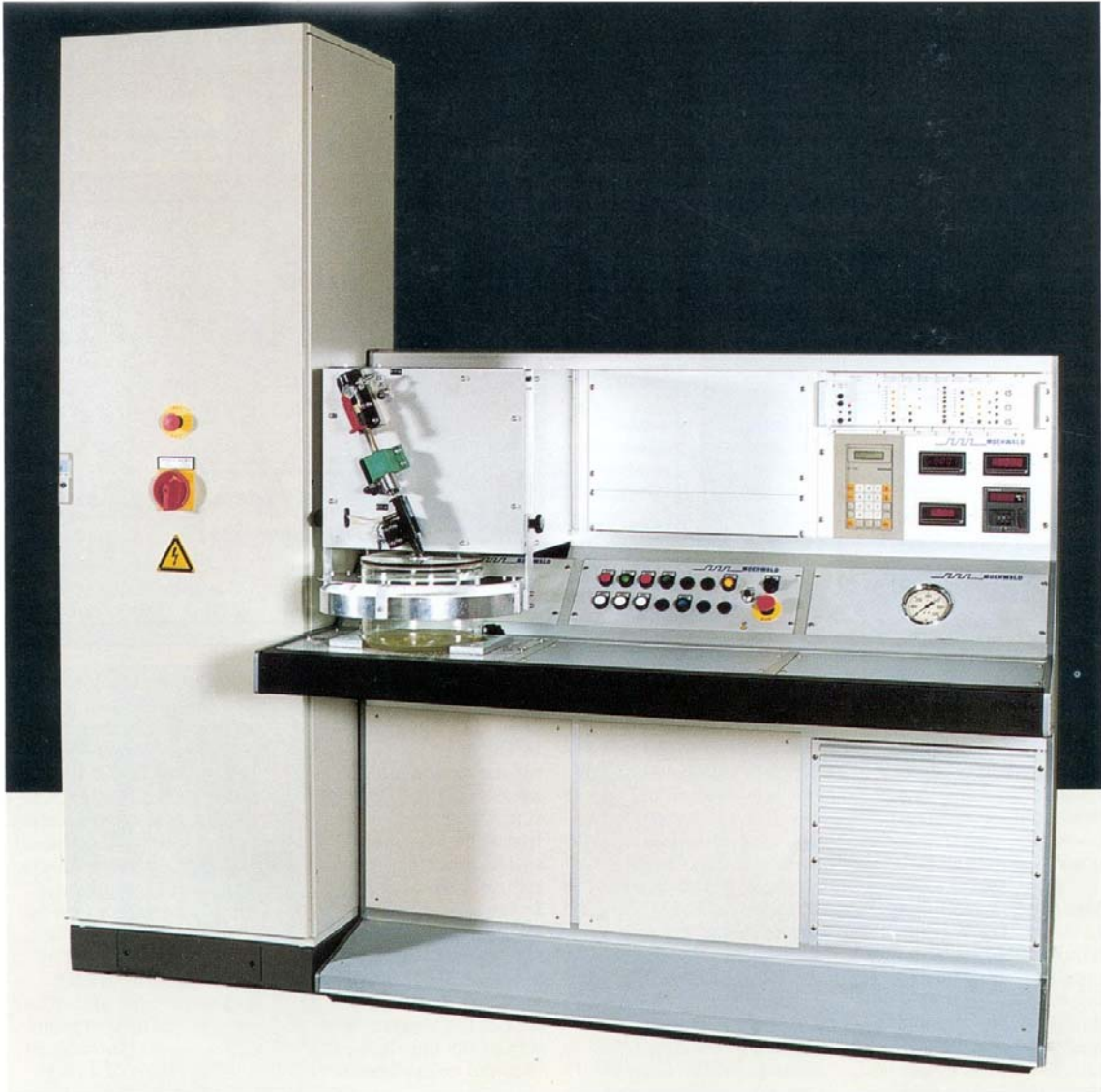


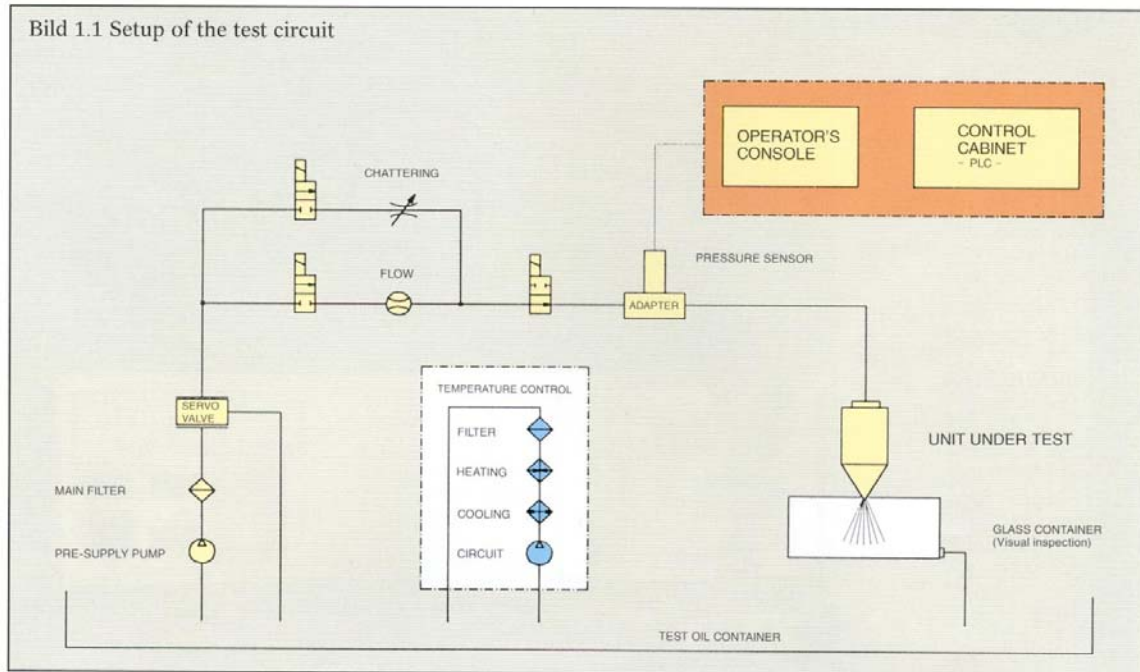
Multi-hole nozzle test bench

DP 4000



Diesel-Multi-hole nozzle test bench

Multi-hole nozzle test bench



General:

This extremely compact and versatile test bench is used for the hydraulic measurement of diesel fuel injectors in research and development, receiving inspections, service and quality assurance.

Measuring principle:

In the **DP** test bench an adjustable pressure is applied to diesel fuel injectors of different designs so that the opening pressure, the flow rate and tightness can be measured and an evaluation of the injection pattern can be made.

General setup:

The function test bench for diesel fuel injectors is of desk design. The test bench is fed manually. For visual evaluation of the injection pattern the injection area is shielded by a glass bell. All control elements required for the operation of the test bench are housed in the test bench stand underneath the working level. The test bench is operated via an operator's console incorporated in the desk. The control system is housed in the attached compact control cabinet.

The interfacing to a host computer for control and automatic data acquisition has been prepared and can be easily retrofitted if needed.

The test bench has its own PLC which executes all control commands entered by the operator (e.g. general startup, tank level monitoring, safety monitoring, switchover of the hydraulic measuring system, control of the indicator lights).

In the shown basic version all functions such as testing of the opening pressure, the nozzle chatter ability and tightness as well as the visual evaluation of the injection pattern can be performed.

Setup of the test circuit:

The unit under test is placed in a fixture and clamped with constant force. The testing fluid is kept within very close temperature limits in a temperature control circuit. The test oil in the circuit is constantly filtered. A high-pressure pump generates a flow to the unit under test. The flow rate is measured by means of a flow meter upstream of the unit under test, the opening pressure is measured at unreduced feed by means of a pressure sensor which is also located upstream of the unit under test.

The chatter ability is measured by means of the same pressure sensor at reduced feed. The measuring results are shown on the indicating and operating panel.

Multi-hole nozzle test bench

Features:

- Compact setup
- Testing chamber designed as desk
- Incorporated oil conditioning
- Protected testing area
- Simple feed to unit under test
- Easy conversion
- constant testing conditions
- Operator's console incorporated in desk
- Indication of measured data on display
- Interfacing to host computer possible
- Rapid, synchronous acquisition of measured data
- Short measuring times
- High measuring accuracy

Holder for unit under test with well illuminated injection area for visual evaluation of the injection pattern.

The following variables can be adjusted by the user:

- Supply pressure adjustment by means of a 10-turn potentiometer up to 450 bar.
- Digital adjustment of the testing fluid temperature between 20 and 40° C.
- Pressure setpoint ramp to control the pressure regulator.

By exchanging the connections the test bench can easily be converted for testing of other types.



Figure 1.2 Unit under test with its holder

Technical data

Supply pump

pressure:	adjustable up to 450 bar
Flow rate:	5 l/min maximum
Testing fluid:	according to ISO 4113, e.g. Shell 1404
Pressure sensor:	measuring range 0 - 500 bar
	operating temp. 0 - 70° C
	linearity $\leq \pm 0.05\%$ - at the calibration temperature
	reproducibility $\leq \pm 0.1\%$ - at the calibration temperature
display	4 1/2 digits

Temperature control: control range 20° - 40° C
control accuracy $\leq \pm 1^\circ$ C

BNC outputs: pressure 0-400 bar \Leftrightarrow 0-10 V
temperature 0-100° C \Leftrightarrow 0-10 V

Dimensions: (lxwxh)
test bench 1550x1225x1400 mm
control cabinet 600x600x2000 mm
Weight: test bench approx. 650 kg
control cabinet approx. 250 kg

Supply connections:

- power: approx. 12 kW 400 V / 50 Hz
- cooling water: 15 l/min at 6° C
- air: 6 bar control air

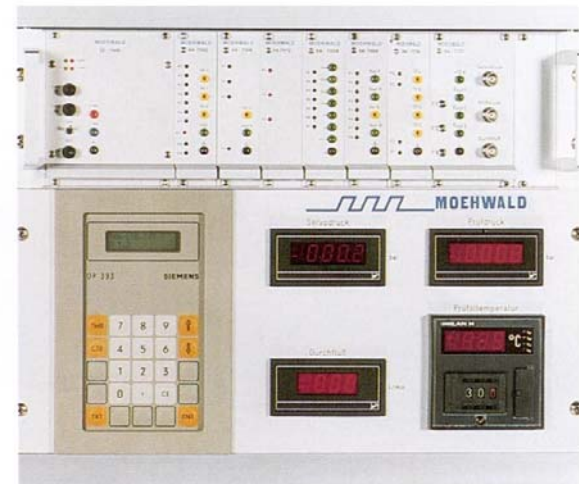


Figure 1.3 Indicating and operating panel

All measured variables at a glance!

A clearly arranged indicating and operating panel continuously informs of the current measured data.

Also located in this area are the BNC-sockets for calibration, plotter or XY recorder connection as well as for the analog control circuits.