

Flow Test Bench

# DFB 1000



### Special features:

- **Stand-alone test bench (explosion-proof design)**
- **For use in gasoline technology field for high pressure injection valves or suction valves**
- **For measuring the static and dynamic flows at injection valves**
- **Flow measurements using highly accurate Coriolis mass flow meters**
- **Measurements correlate to Bosch production measuring technology**
- **Integration of spray pattern evaluation possible**
- **Simple to use**
- **Easy to adapt to suit different test samples**
- **Compact design**
- **Control electronics on 19" sub-rack system**
- **High reliability**
- **Suitable for use in a harsh production environment**

#### **General**

The DFB 1000 test bench is used for measuring the static and dynamic flows at high pressure injection valves (HPIV) and suction pipe valves. The field of high pressure gasoline injection technology in particular demands ever more precise testing and measurement of the injection flow.

The test bench is designed to Bosch standards in order to maintain correlation with existing Bosch test benches. It is therefore especially suitable for use in connection with quality assurance.

The modular test sample inserts allow a wide range of test samples to be accommodated

#### **Principles of the test**

The gasoline injection valves are supplied with a constant hydraulic head by means of a piston accumulator. The pressure is generated by the piston accumulator in a nitrogen system. Upstream of the test sample there is a Coriolis mass flow meter, which is used to determine the static and dynamic flows. As an option, the spray can also be investigated optically using the appropriate equipment.

#### **Setup**

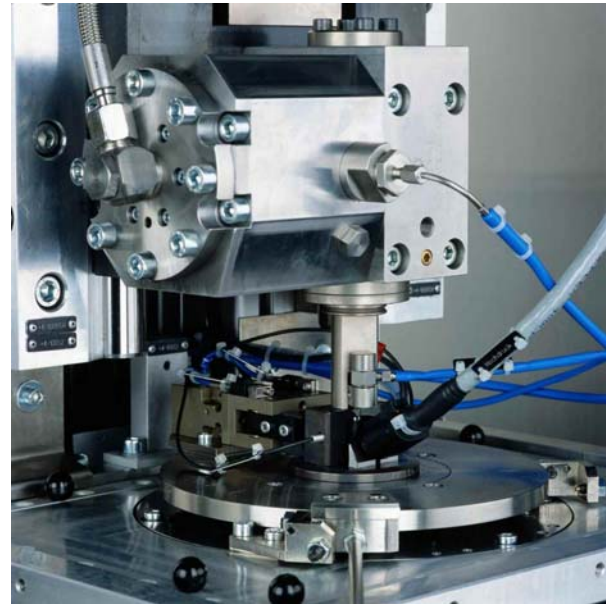
*The test bench is designed for use in explosion-proof Zone 1 (EEx-II 2G).*

It consists of the following main components:

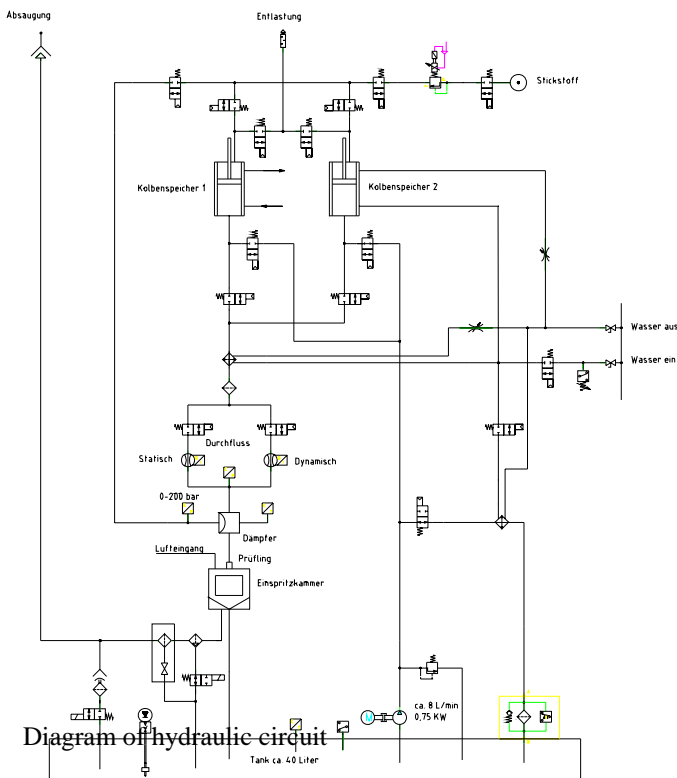
- Support frame with hydraulic unit and pressure generator
- Test room protected with transparent panels with configurable test sample inserts, automatic pneumatic clamping and manual rotator to turn the test sample through  $\pm 90^\circ$  (option for automatic rotation)
- 2 piston accumulators positioned above the test sample to generate pressure (used alternately)
- 2 mass flow meters to determine the static and dynamic flows
- Positive pressure encapsulated operating cabinet for the instrumentation and the electrical control of the injection valve (e.g. end of testing stage)
- Control cabinet, which is not explosion-proof and therefore must be set up outside the explosion-proof area.

### Test procedure

- Test sample is placed manually into the reception
- Electrical connections adjusted and made manually
- Test sample type is input and test parameters called up
- Once the sequence starts, the test sample is automatically pneumatically clamped and supplied with the fuel medium
- The system runs through the testing programme
- The static and dynamic flows are measured
- At the end of the test the safety door opens automatically
- The test sample is removed



Test sample insert



- The flow to the injection valve is measured on the supply side. The use of 2 Coriolis mass flow meters with different measuring ranges allows the flow for valves that are open for long periods (static flow) and for valves subject to dynamic control with different time periods  $T$  and opening times  $t_i$  to be accurately measured (dynamic flow). A damping device fed with nitrogen in the test head ensures that the injection pressure is kept very constant.

## Technical data:

Testing medium	n-heptane
Test sample	High pressure injection valves or suction valves
Supply pressure	20 – 250 bar (300 bar on request. Optional separate low pressure circuit 2- 10 bar)
Measuring range	Static flow D13: 20 – 250 kg/h Accuracy: $\pm 0.15\% \pm 1$ digit
	Dynamic flow DI1.5: 5 – 65 kg/h Accuracy: $\pm 0.15\% \pm 1$ digit
Medium temperature	20 °C $\pm 2^\circ\text{C}$
Electrical supply	Mains voltage: 3 x 400 V / 50 Hz Max. fusing: 3 x 35 A Rated power: 12 kVA Control voltage: 24 VDC Optional: modification for different mains networks
Dimensions:	2904 x 1200 x 2000 (l x w x h in mm)
Weight:	4300 kg

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