

P4010 ISO NOZZLE FLOW MEASUREMENT RIG

APPLICATIONS

- ◆ Nozzle coking programme studies
- ◆ Allows testing of nozzles to ISO 4010 (nozzle openings 0 to 1.5 mm)
- ◆ Assessment of effects of engine running time on nozzle flow characteristics

FEATURES

- ◆ Allows testing over range of nozzle openings
- ◆ Both new and used nozzles can be tested
- ◆ Close control of nozzle differential pressure and air drying
- ◆ Excellent repeatability

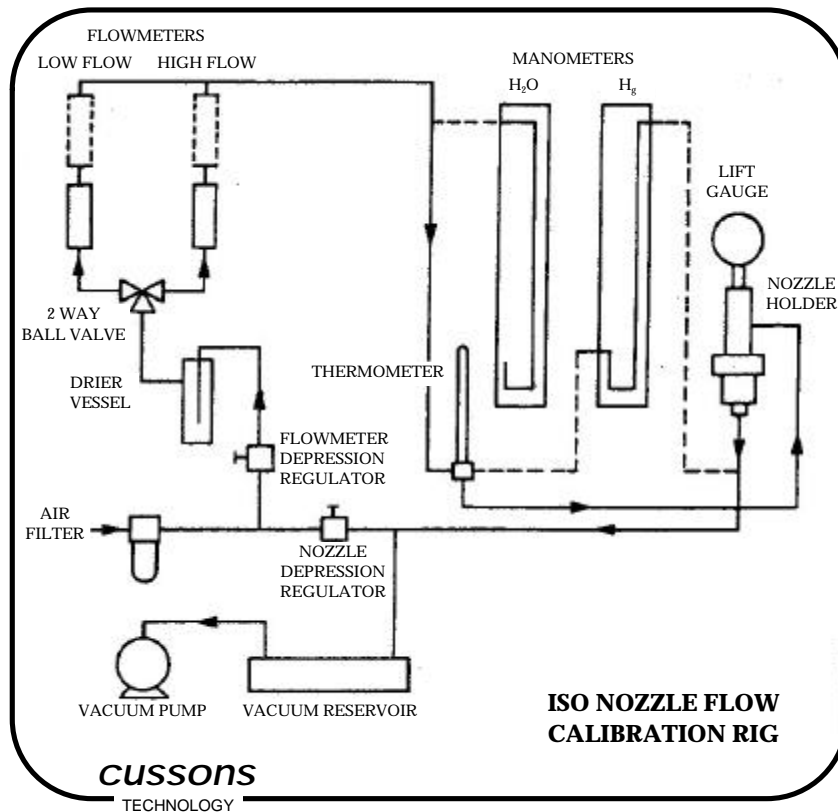
DESCRIPTION

The International Standard ISO 4010 specifies a nozzle for testing and setting injection pumps on injection pump test benches. The standard specifies the dimensions and construction of the nozzle and defines the flow characteristics on air under controlled test conditions.

Cussons P4010 ISO Nozzle Flow Measurement Rig has been designed to allow repeated tests to be carried out in accordance with the standard on both the specified nozzle, and other physically similar nozzles, under repeatable controlled conditions of nozzle inlet pressure and pressure drop. Measurements of nozzle flow rate, and air temperature and pressure can be made, allowing comparisons to be made between the flow characteristics of individual nozzles.

The Cussons Nozzle Flow Measurement Rig consists of a regulated vacuum source which is used to draw filtered and dried air at room temperature through the nozzle under test, the air flow rate, temperature and pressure being measured. The nozzle is mounted in a nozzle holder assembly which allows the nozzle opening to be accurately set anywhere within its normal operating range.

N.B. The range of nozzle openings catered for is 0 to 1.5 mm opening. A standard pintle type nozzle as defined in ISO 4010 is also supplied.



SCHEMATIC DIAGRAM

The nozzle is mounted securely in a nozzle holder assembly. The nozzle needle is held in a collet, the height of which can be finely adjusted relative to the nozzle body to vary the nozzle opening. A Dial Test Indicator with minimum scale divisions of 0.002 mm is used to measure the nozzle opening, allowing very close control and a high degree of repeatability of the setting.

The support frame for the flow rig is constructed from rectangular hollow section steel. It supports a back panel on which are mounted the air flow meters, the flow meter selection valve, the manometers and interconnecting pipe work. The vacuum pump and vacuum vessel are mounted on a horizontal support panel, above which a further panel supports the nozzle holder assembly and the remainder of the small components.

NB Corrections to Standard Conditions

ISO 4010 states that flow measurements should be corrected to 0.98 bar absolute pressure and a temperature of 20°C. By reference to the ambient pressure, the actual nozzle inlet pressure can be measured by the manometer and adjusted by the

vacuum regulator to achieve 0.98 bar absolute pressure (except where the ambient pressure is already below this figure). The rotameter flow meters are calibrated to 0.98 bar and 20°C so the only correction of results required is a temperature correction to the flow reading. The temperature of the air entering the nozzle is measured using the mercury in-glass thermometer provided, and a correction made from the temperature measured, to 20°C using the conversion chart provided.

SERVICE REQUIREMENTS

The flow measurement rig requires a 220/240 volt single phase 50 Hz power supply rated at a minimum of 0.37 kW. No other services are required.

DIMENSIONS

Overall dimensions 850 wide x 850 deep x 1800 mm high.

Weight approximately 120 Kg.

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