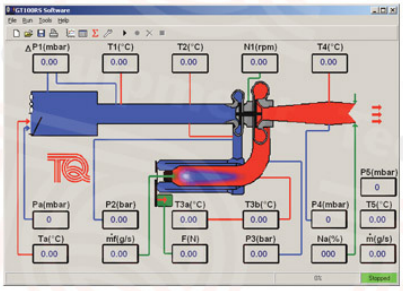
GT100RS

Turbojet Trainer with Reheat

Allows detailed experiments that show how a single-shaft gas turbojet with reheat (afterburner) works, and tests its performance



Screenshot of the GT100RS software (included)

- Uses industrial parts, powered by kerosene for realistic tests and results
- Includes reheat (afterburner) section
- Fully interlocked starting procedure and automatic shut-down
- Automatic Data Acquisition (ADA) included (supplied with software)
- Supplied with 'Gas Turbine Theory' textbook
- Full schematic coloured instrumentation panel diagram shows students what each part does
- Well proven design - versions installed in universities, technical colleges and military training establishments in 30 countries worldwide

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An ISO 9001 certified company

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Description

A self-contained, fully instrumented, educational single-shaft gas turbine with reheat. Powered by kerosene, the experimental abilities of this high-quality apparatus enable comprehensive practical investigations into the principles, and performance of single-shaft gas turbines with reheat.

It is a steel frame that holds a gas generator, combustion chamber, oil and fuel tanks, pumps, ancillaries and guards. Above these is an instrumentation and control panel with schematic diagram. The clearly labelled front panel with mimic diagram includes the instrument displays, controls and warning lights.

Air passes into an air box, into a compressor, then into the combustion chamber. A pump transfers fuel from the fuel tank to spray through a special nozzle into the combustion chamber. A high-energy spark ignites the air and fuel mixture, that flows to radial flow turbine, then to the reheat section. This increases the temperature and velocity of the gas. It then passes through a variable area propelling nozzle. The exhaust gases then discharge to a suitable exhaust system. The combustion chamber gives excellent combustion, low pressure loss and good flame stability over a wide range of conditions. A fuel flow control valve on the instrumentation and control panel regulates the speed. This design reduces the possibility of overspeed. A separate control adjusts the fuel flow to the reheat section.

The equipment has an oiling system including filters and water-cooled oil.

Starting is semi-automatic and fully interlocked, controlled by a start up and shut down logic system. For protection of the equipment and user, it shuts down the turbine if the user makes an error.

Digital indicators show shaft speed, pressures, temperatures and fuel flow. Analogue indicators show fuel level, fuel pressure, oil temperature, oil pressure and hours run.

This equipment connects to your computer (computer not supplied) and includes dedicated, user-friendly data acquisition software. This allows students to display, graph and analyse all relevant variables, and save their results for later analysis. The data acquisition system includes adaptors and leads, and the software is supplied on CD-ROM.

Supplied with the equipment is a detailed textbook that covers the theory and use of gas turbines.

Standard Features

- Supplied with a comprehensive User Guide and textbook
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

Experiments

Various investigations into single-shaft turbine thrust jet performance, including:

- Effect on thrust generation by variation in rotational speed, reheat temperature and propelling nozzle area
- Isentropic, polytropic and mechanical efficiencies of compressor, combustion chamber, turbine and reheater
- Pressure ratios of turbine, compressor, reheater and non-dimensional characteristics
- Combustion chamber and reheater pressure losses and combustion efficiencies
- Specific fuel consumption, thermal efficiency, air standard cycle, work ratio and heat balance

Recommended Ancillary

A computer with:

Intel® Pentium® (or equivalent) Processor

VGA monitor

CD-ROM drive

Serial Port

10 MB hard disc space

Standard 2 button mouse and keyboard

Microsoft® Windows® 2000, XP, Vista and Windows 7

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Specification

Note: All performance specifications are nominal and determined by local conditions.

Nett Dimensions and weight:
1350 mm x 1700 mm x 1100 mm and 375 kg (with no fuel or oil)

Packed Dimensions and weight:
4 m^3 and 550 kg

Fuel:
Kerosene, specification:

- Specific gravity (or relative density): 0.78
- Net calorific value: 43.6 x 106 J/kg
- Flash point: 38 to 66°C
- Freezing point: -38 to 46°C
- Viscosity: 1.4 to 2.5 x 10^{-6} $m^2.s^{-1}$
- Boiling-point (final): 260°C

Speed Range
50 000 to 90 000 $rev.min^{-1}$

Approximate Maximum Thrust:
50 N

Note: Local operating conditions, such as air and fuel quality will affect maximum thrust.

Digital instruments:
Shaft speed, Pressures, Temperatures, Fuel flow, Thrust and Nozzle area.

Analogue instruments:
Fuel level and pressure, Oil temperature and pressure, Filter condition and Total hours run.

Essential Services

Floor space needed:
2000 mm x 2000 mm of solid, level floor

Electrical supply:
230 VAC, 50 Hz single-phase
(other ratings available - specify on order)

Water supply:
At least 18 litres per minute

Exhaust:
At least 200 mm diameter, direct to atmosphere

Vent:
For oil breather pipe - 19 mm

Operating Conditions

Operating environment:
Dry and well-ventilated engine test laboratories

Storage temperature range:
–25°C to +55°C (when packed for transport)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
30% to 95% (non-condensing)

Sound Levels

This equipment emits sound levels greater than 100 dB(A)

TecQuipment recommends that you wear ear defenders when you work with or near to this equipment.