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PRODUCT DATA SHEET
Catalogue reference for product evaluation

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Two Shaft Gas Turbine Study Apparatus | ThermoFlux - 7087

Category: Thermodynamics Lab Equipment · **Country of Origin:** India

Product Overview

The Two Shaft Gas Turbine Study Apparatus ThermoFlux - 7087 is a wheeled, laboratory-scale training unit for the study of gas turbine operation in a two-shaft configuration. This two shaft gas turbine trainer covers the complete Joule-Brayton cycle, with a turbocharger assembly (30,000 to 90,000 rpm), a power turbine (2,000 to 23,000 rpm), a propane/butane LPG combustion chamber, and a 1 kW alternator on a single steel frame. Five temperature points, six pressure points, two shaft speed measurements, and generator electrical output are all displayed on a mimic diagram panel. The unit is available in manual and computerized versions, with optional LABVIEW-based DAQ software for automated data acquisition and analysis.

View this product online: https://scienticoindia.com/product/two-shaft-gas-turbine-study-apparatus-thermoflux-7087/



Request a model-specific quotation
Include quantity and delivery country.

Technical Specifications

Two Shaft Gas Turbine Study Apparatus ThermoFlux - 7087, Technical Specifications

Parameter	Value
Model	ThermoFlux - 7087
Configuration	Two-shaft gas turbine
Frame	Wheeled steel frame with mimic diagram panel
Combustion Chamber Fuel	Propane/butane LPG gas from cylinder
Turbocharger Speed Range	30,000 to 90,000 rpm
Compression Ratio	Approx. 2:1
Power Turbine Speed Range	2,000 to 23,000 rpm
Alternator Output	1 kW at 3,300 rpm
Power Turbine to Alternator Drive	Toothed belt
Electrical Load	Resistive load
Oil Tank Capacity	20 litres
Lubrication	Oil pump, oil filter, water/oil heat exchanger
Starting Device	Auxiliary starting fan
Silencing	Effective silencing at intake and exhaust

Parameter	Value
Electric Supply	220/380 V three-phase, 50 to 60 Hz, 3 kW
Gas Supply	Propane/butane LPG from cylinder, 5 bar minimum
Water Supply	Laboratory mains
Software (Optional)	DAQ software, National Instruments LABVIEW, Windows compatible
Scope of Delivery	1 experimental unit, 1 instruction manual

Technical Data

Power Turbine

Parameter	Value
Speed Range	2,000 to 23,000 rpm
Drive to Alternator	Toothed belt
Alternator Output	1 kW at 3,300 rpm

Turbocharger Assembly

Parameter	Value
Speed Range	30,000 to 90,000 rpm
Compression Ratio	Approx. 2:1

Combustion Chamber

Parameter	Value
Fuel	Propane/butane LPG gas from cylinder
Ignition	Spark plug
Gas Flow Control	Gas flow rate regulation valve

Lubrication System

Parameter	Value
Oil Tank Capacity	20 litres
Oil Pump	Included
Oil Filter	Included
Cooling	Water/oil heat exchanger
Oil Pressure Monitoring	Pressure gauge for lubricating oil pressure control

Instrumentation, Manual Version

Instrument	Type
Ammeter	Digital
Voltmeter	Digital
RPM Meters	Digital
Temperature Indicators	Digital
Pressure Gauges	Analog

Instrumentation, Computerized Version

Instrument	Type
Ammeter	Digital with signal converter
Voltmeter	Digital with signal converter
RPM Meters	Digital with signal converter
Pressure Gauges	With pressure/current converter
Gas Flow Meter	Included
U-Manometer	Included
A/D Conversion Unit	Feeding, signal conditioning, and A/D conversion
Data Acquisition Software	National Instruments LABVIEW, Windows compatible

Measurement Points (Mimic Diagram)

Label	Measurement	Unit
T1	Air temperature, inlet	°C
T2	Compressed air temperature	°C
T3	Combustion chamber temperature	°C
T4	Turbocharger outlet / power turbine inlet temperature	°C
T5	Exhaust temperature	°C
P2	Compressor outlet pressure	kPa
P3	Combustion chamber pressure	kPa
P4	Turbocharger outlet / power turbine inlet pressure	kPa
P5	Exhaust pressure	kPa
PB	LPG/propane gas pressure	kPa
P6	LPG/propane regulated gas pressure	kPa
V	Generator voltage	V
I	Generator current	A
nGG	Turbocharger speed	rpm
nTP	Power turbine speed	rpm
Qg	Gas flow rate (gas flow meter)	-
Qa	Air flow (orifice meter)	-
S	Oil pressure gauge	-

Required Services

Service	Requirement
Electric Supply	220/380 V three-phase, 50 to 60 Hz, 3 kW
Gas Supply	Propane/butane LPG from cylinder, 5 bar minimum
Water Supply	Laboratory mains

Key Features

Key Features

- **Configuration:** Two-shaft gas turbine, power turbine separate from turbocharger shaft
- **Turbocharger Speed:** 30,000 to 90,000 rpm, compression ratio approx. 2:1
- **Power Turbine Speed:** 2,000 to 23,000 rpm, toothed belt drive to alternator
- **Alternator Output:** 1 kW at 3,300 rpm, electrical energy dissipated on resistive load
- **Combustion Fuel:** Propane/butane LPG gas from cylinder, 5 bar minimum supply
- **Two Shaft Gas Turbine Starting:** Auxiliary starting fan initiates the high-pressure turbine
- **Lubrication:** Oil pump, oil filter, 20-litre oil tank, water/oil heat exchanger
- **Silencing:** Effective intake and exhaust silencing for safe indoor laboratory operation
- **Mimic Diagram Panel:** All sensors visualized on process schematic with measurement displays
- **Measurement Points:** 5 temperature points (T1 to T5), 6 pressure points (P2 to P6, PB), generator voltage and current, two speed measurements, gas and air flow rates
- **Manual Version:** Digital meters for temperature, RPM, voltage, current; analog pressure gauges
- **Computerized Version:** Signal converters on all instruments, gas flow meter, U-manometer, A/D conversion unit, LABVIEW-based DAQ software
- **Frame:** Wheeled steel frame for easy laboratory repositioning
- **Optional Software:** National Instruments LABVIEW DAQ software, Windows compatible

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Experiments

- Study of a Joule-Brayton cycle
- Study on a reduced scale of a plant for the production of electrical energy by a gas turbine
- Study of the starting procedure of a gas turbine
- Measurement of the air flow input as a function of the speed of the turbocharger
- Pressure and temperature in the combustion chamber as a function of the speed of the turbocharger
- Calculation of the specific consumption as a function of the speed of the turbocharger
- Calculation of the output power as a function of the speed of the power turbine
- Determination of the power output with different input parameters
- Study of safety systems in the operation of a gas turbine

Construction and Design

The Two Shaft Gas Turbine Study Apparatus ThermoFlux - 7087 is built on a wheeled steel frame, allowing easy repositioning within a laboratory. The base supports the combustion chamber, turbocharger assembly, power turbine, and alternator as a compact, integrated unit. A front-facing mimic diagram panel carries all measurement instruments, giving students a clear visual representation of the process flow.

The two shaft gas turbine arrangement separates the turbocharger shaft from the power turbine shaft. Combustion gases first expand through the turbocharger turbine to drive the compressor, then pass through the power turbine to generate shaft work. The power turbine connects to the alternator via a toothed belt. Generated electricity is fed to a resistive load for dissipation.

The combustion chamber burns propane/butane LPG gas supplied from a cylinder. A spark plug provides ignition. A gas flow rate regulation valve controls fuel supply, and a gas flow meter (computerized version) measures fuel consumption. Air enters through an air filter. An orifice meter measures air flow. An auxiliary starting fan initiates rotation of the high-pressure turbocharger stage before combustion begins.

The lubrication circuit consists of an oil pump, oil filter, 20-litre oil tank, and a water/oil heat exchanger cooled by laboratory mains water. Oil pressure is monitored by a dedicated pressure gauge. Intake and exhaust silencing is built into the unit for safe indoor operation. A gas exhaust duct channels combustion products out of the working area.

All measurement points, covering five temperatures, six pressures, generator voltage, generator current, two shaft speeds, and gas and air flow rates, are displayed on the mimic diagram panel. In the computerized version, signal converters on each instrument feed data to a feeding and A/D conversion unit for software acquisition and analysis.

Software

ThermoFlux - 7087 DAQ Software (Optional)

The optional data acquisition software for the two shaft gas turbine apparatus is developed in the National Instruments LABVIEW environment. It measures and calculates results from all apparatus sensors. The software runs on any Windows operating system. When the software option is selected, a set of electronic sensors with signal converters is included.

Scope of Delivery

- 1 experimental unit
- 1 instruction manual

Required for Operation

- Electric supply: 220/380 V three-phase, 50 to 60 Hz, 3 kW
- Propane/butane LPG gas supply: from cylinder, 5 bar minimum
- Water supply: from laboratory mains

Optional Accessories

- ThermoFlux - 7087 DAQ software (National Instruments LABVIEW, Windows compatible), including electronic sensors with signal converters
- Gas type pre-mixed burner (if applicable; specify at time of order)

Ordering & Delivery

- Send the product name, quantity, delivery country and destination with your enquiry.
- Production schedule, freight, payment terms and export documents are confirmed in the written quotation.

Frequently Asked Questions

Q1: What is the difference between the manual and computerized versions of the ThermoFlux - 7087?
The manual version uses digital meters and analog pressure gauges with direct display on the mimic panel. The computerized version adds signal converters on all instruments, a gas flow meter, a U-manometer, an A/D conversion unit, and LABVIEW-based data acquisition software for automated measurement and analysis.

Q2: What fuel does the two shaft gas turbine apparatus use?
The combustion chamber uses propane/butane LPG gas supplied from a cylinder. The gas supply pressure must be a minimum of 5 bar.

Q3: How is the power turbine connected to the alternator?
The power turbine is coupled to the alternator by a toothed belt. The alternator generates 1 kW at 3,300 rpm, and the power turbine operates between 2,000 and 23,000 rpm.

Q4: What safety systems are included on the ThermoFlux - 7087?
The unit includes an emergency switch, gas flow control and regulation valves, oil pressure monitoring, and effective intake and exhaust silencing. The apparatus also supports a dedicated experiment on gas turbine safety systems.

Q5: Is the ThermoFlux - 7087 DAQ software compatible with standard laboratory computers?
Yes. The optional DAQ software runs in the National Instruments LABVIEW environment and is compatible with any Windows operating system.

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