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MODEL 7710

Laboratory Air Data Test Set



- High accuracy, RVSM compliant
- Ideal for ATE systems, only 180 mm (4U) high
- Accuracy to 2 ft, 0.03 knots
- One year calibration interval
- Automatic zeroing
- Variety of Ps and Pt ranges available



MODEL 7710

Laboratory Air Data Test Set

For over 30 years, Ruska has provided high precision Air Data Test Sets (ADTS) to the aerospace industry, airframe and component manufacturers for testing avionics instrumentation used on a variety of aircraft from fixed wing to rotary to the space shuttle. The Model 7710 Air Data Test Set represents the latest generation ADTS incorporating Ruska's unique, time-proven quartz sensor with unequalled precision and long term stability. This, coupled with the latest pressure control technology, provides high performance measurement and control of all air data parameters.

The Model 7710 is a high performance, laboratory ADTS for calibrating a wide variety of avionics instrumentation such as altimeters, airspeed indicators, rate of climb meters, Mach meters, air data computers and engine based control systems that rely on accurate control and measurement of pressure. The Model 7710 can be used to calibrate devices that are required to meet the Reduced Vertical Separation Minima (RVSM) requirements, controlling altitude to within 2 feet (better than 0.003 inHg) at sea level.

The Model 7710 is ideal for use in Automatic Test Equipment (ATE) systems. The 180 mm height (4U) allows easy integration into comprehensive test systems. Additionally, an IEEE-488 interface is provided for PC based control. The Model 7710 can be set to emulate Ruska's previous generation ADTS (Model 6610), thereby eliminating the need to alter existing software. It can also emulate the Druck Models 401 and 405 ADTS.

The Model 7710 incorporates a variety of features including:

Automatic Go To Ground

Upon selecting the go to ground command, the Model 7710 safely controls the pressure to the current, local barometric pressure. The user can then disconnect the device under test (DUT) without exposing sensitive instruments to a potential pressure transient or shock.

Leak Test Mode

A separate mode is provided for performing leak checks prior to beginning an actual calibration. The operator can set limits so that an audible alarm will sound if the limits are exceeded. Further, the 7710 will automatically regain control if the leak rate is over limit or if the leak takes the pressure outside the user defined upper or lower pressure limits to protect the DUT.

Protecting the Device Under Test

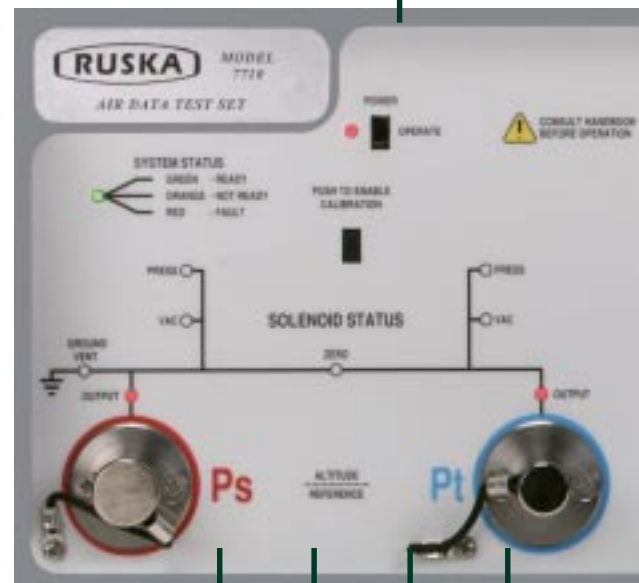
In order to protect the DUT, the operator can program in high and low limit settings for:

- Altitude
- Airspeed
- Rate of climb
- Mach

Also, all the above limits can be programmed into the Model 7710 by aircraft type.

Further, upon power loss, the Model 7710 will release pressure in the Ps and Pt channels, at a safe rate, back to ground/ambient pressure so that the DUT can be safely disconnected.

System operational status indicators



Front and rear test ports with caps provide installation versatility

Height reference indication for head correction between 7710 and DUT

Internal vacuum sensors allow fully automatic zeroing

Control valve indicators keep the operator informed at all times

All necessary information is provided on a simple, easy-to-read display

Soft function keys for easy menu access and navigation



Membrane keypad for data input, and easy maintenance – just wipe clean

EPR function for performing engine pressure ratio testing

Go To Ground key safely returns the DUT to ambient pressure, automatically

Initiate leak test mode to insure DUT meets leak requirements prior to calibration

Automatic Volume Characterization

The Model 7710 automatically tunes the controller into external volumes ranging from 80 to 16,400 cubic centimeters allowing a large degree of flexibility for the configuration of the test system and the type of aircraft and components to be tested. For component manufacturers, a large number of devices can be tested simultaneously on a single manifold.

Engine Pressure Ratio

The Model 7710 can be supplied in a variety of pressure range configurations specific to your requirements. For example, the Model 7710 can be ordered with a Ps and Pt full scale range of 3385 mbar (100 inHg) allowing EPR testing to 3385 mbar.

Test Program Manager

Optional Test Program Manager (TPM) software allows the creation of complex test routines to be created on a PC and then downloaded and stored internally in the Model 7710. Multiple test routines can be stored and executed directly from the front panel.

Automatic Zeroing

As with any instrument, regular zeroing is suggested to achieve maximum performance. This task is now automated and can be performed at the push of a button, or over the IEEE-488 interface. The Model 7710 incorporates the latest technology vacuum sensors on-board; no separate or external vacuum gauges or sensors are required. In addition, only one vacuum pump is required to operate and zero the Model 7710 ADTS.

Calibrated and True Airspeed

The Model 7710 displays both calibrated and true airspeed. When true airspeed is required, simply input the aircraft's Pt temperature reading into the Model 7710 via the front panel or IEEE-488 interface.

Avionics and Pressure Units

The Model 7710 displays the common avionics units including feet and meters for altitude, calibrated and true airspeed in knots, km/hr, mph and Mach with corresponding rate displays for all the above per minute. It can also display pressure units of mbar, inHg @ 0°C, mmHg, inH₂O @ 4, 20 °C and 60 °F, psi, hPa and kPa.

High Performance for fixed wing or rotary aircraft

Although the standard range offered is a Ps range of 1084 mbar (32 inHg) and a Pt range of 3385 mbar (100 inHg), Ruska also offers custom ranges. For example, for exclusive testing of rotary aircraft, a Pt range of 1084 mbar (32 inHg) can be provided, increasing performance in the lower airspeed ranges. Please refer to the back page for the various range combinations available.

Dynamic Testing

The 7710 can generate sinusoidal variations of either altitude or airspeed which is useful for testing autopilot systems or conducting sensitivity tests.

Specifications

MEASUREMENT SPECIFICATION

Standard Altitude Sensor Range (Ps): 1084 mbar (32 inHg) abs

PARAMETER	OPERATING RANGE	RESOLUTION	TOTAL UNCERTAINTY ⁽¹⁾
Altitude	-1870 to 100,000 ft	1 ft	2 ft at sea level 3 ft at 30,000 ft 9 ft at 60,000 ft
Static Sensor	10 to 1084 mbar abs (0.3 to 32 inHg abs)	0.01 mbar	0.08 mbar at 1015 mbar abs 0.05 mbar at 500 mbar abs 0.03 mbar at 170 mbar abs
Rate of Climb	0 to 50,000 ft/min ⁽²⁾	1 ft/min	1% of value

¹Total uncertainty is defined as the two sigma combined effects of linearity, hysteresis, repeatability, thermal effects and the uncertainty of Ruska's primary standard, which includes the uncertainty from NIST, based on a one year calibration interval.

²100,000 ft/min rates selectable
- Limit protected for safety
- Volume dependent

³Limits set to prevent excessive Mach (Civil limit Mach 1)

Two Standard Pitot (Pt) Sensor Ranges are Available: 3385 mbar (100 inHg) or 1084 mbar (32 inHg) abs

PARAMETER	RESOLUTION	Standard Fixed Wing Aircraft Total Sensor Range (Pt): 3385 mbar (100 inHg) abs		Standard Rotary Wing Aircraft Total Sensor Range (Pt): 1084 mbar (32 inHg) abs	
		OPERATING RANGE	TOTAL UNCERTAINTY ⁽¹⁾	OPERATING RANGE	TOTAL UNCERTAINTY ⁽¹⁾
Airspeed	0.1 kts	0 to 1000 knots	0.5 kts at 50 kts 0.04 kts at 400 kts 0.04 kts at 1000 kts	0 to 240 knots	0.2 kts at 50 kts 0.08 kts at 100 kts 0.03 kts at 240 kts
Pitot Sensor	0.01 mbar (0.0001 inHg)	10 to 3385 mbar abs (0.3 to 100 inHg abs)	0.29 mbar at 3385 mbar abs 0.15 mbar at 1690 mbar abs 0.85 mbar at 170 mbar abs	10 to 1084 mbar abs (0.3 to 32 inHg abs)	0.08 mbar at 1084 mbar abs 0.05 mbar at 508 mbar abs 0.03 mbar at 170 mbar abs
Mach	0.001	0 to 10.000 ⁽³⁾	Better than 0.002	0 to 4.000 ⁽³⁾	Better than 0.002
Engine Pressure Ratio (EPR)	0.001	0.1 to 10	Better than 0.002	0.1 to 10	Better than 0.002

OPTIONAL PRESSURE RANGE

Ruska can also provide the Model 7710 with the following range combinations:

Ps / Pt
1084 mbar (32 inHg) / 2300 mbar (68 inHg)
3385 mbar (100 inHg) / 3385 mbar (100 inHg)

DISPLAY

LCD backlit, supertwist/wide angle viewing, 123 x 42 mm (4.8" x 1.6")
4 lines by 20 characters

Scaling Factors

Altitude: ft, meters

Airspeed: knots, km/hr, mph, Mach

Others: mbar, inHg @ 0°, inH2O @ 4,20 °C and 60 °F, mmHg, kPa, hPa, psi

CONTROL

Rate Control Indication

RoC – Rate of Climb

RtQc – Rate of Pt - Ps

RtPt – Rate of Pitot

RtCAS – Rate of Calibrated Airspeed

RtPs – Rate of Static

RtEPR – Rate of Engine Pressure Ratio

Control Stability: 0.002% full scale

OPTIONS

Bench top cabinet (as pictured)

Lines and Fittings Kit (supply and test lines)

Vacuum Pump, 139 liter/minute capacity with auto-vent valve, filter and muffler

Remote Terminal (consult factory)

GENERAL

Electrical power

115/230 VAC, 50/60 Hz, 15 W

Temperature

Operating temperature 15–28 °C; storage temperature -20 to 70 °C

Humidity

Operating humidity 20–75% relative humidity, non-condensing
storage humidity 0–95%, non-condensing

Pressure medium

High purity nitrogen or dry, clean air

Calibration

One year interval recommended. Use of primary standard such as Ruska Model 2468 Pitot Static Gas Piston Gauge recommended.

Digital Interface

IEEE-488.2

Pneumatic Connections

Static AN-6 Pitot AN-4

Vacuum Supply AN-6

Pressure Supply AN-4

Weight and Dimensions

27 kg, 485 mm W x 180 mm H x 710 mm D

Other products and services

Ruska also manufactures a wide range of primary standard piston gauges for pressures from 14 mbar to 5000 bar and digital pressure gauges and controllers from 0.07 to 2750 bar.



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Agent:

Due to Ruska Instrument's process of continuous improvement, the printed specifications are subject to change without notice.