

ADTS 405

Druck Air Data Test System

GE is the foremost supplier of air data test systems, with over 25 years experience in the design and manufacture of advanced pressure measuring instruments and sensors.

The ADTS 405 is a series of reliable, high accuracy, air data test systems. The rugged, compact design has evolved as a result of GE's continuous research and development, customer feedback and experience gained from manufacturing thousands of automatic pressure controllers. This has enabled performance, maintainability, and operational simplicity to be optimized.

Features:

- High accuracy, RVSM compliant
- Flightline and rack mount versions
- Civil and military specifications
- Integral or remote pressure/vacuum supplies
- Fully programmable for aircraft type
- Protection for aircraft instruments



The ADTS 405 series is a proven world leader and industry standard specified by many:

- National and international civil airlines
- Military forces
- Aircraft manufacturers
- Ground support organisations
- Corporate fleet owners

The ADTS 405 is a twin-channel Ps and Pt pressure control system used for the precision calibration/verification of aircraft pitot statics, compliant with RVSM (reduced vertical separation minima) requirements.

Fully programmable for a wide range of fixed or rotary wing aircraft operating envelopes, the ADTS 405 enables vital flight instrumentation, such as altimeters, airspeed indicators, rate of climb indicators, Mach meters and air data computers to be accurately and rapidly tested. A remote control hand terminal enables the instrument to be driven from the cockpit or flight deck by a single operator.

This versatile instrument can be supplied in three formats:

- **ADTS 405—Rack Mounted Unit**
This is a compact, 50 cm (19 in) rack mounting unit for laboratory or workshop use. It is ideal for integration with ATE systems, or simply for use as a convenient bench top tool. Pneumatic connections are available via either the front or rear panel to suit specific applications. An optional matched pressure/vacuum supply unit (PV103R) is available as a separate rack module.
- **ADTS 405F—Transportable Flight Line Unit**
This is a self contained portable unit with integral pressure/vacuum supplies, housed in a single military standard enclosure. It is ideal for calibration and simulation on the flightline.
- **ADTS 405c—Towable Cart Unit**
This is a self-contained unit with both pressure/vacuum sources, mounted in a towable enclosure. It is ideal where security is paramount and provides lockable storage for associated hoses and fittings. A simplified termination plate is provided for both electrical and pneumatic connections that also allows an optional Line Switching Unit (LSU 100) to be fitted. This enables centralized control of multiple aircraft tests, which can be carried out sequentially by automatic switching of up to four Ps and Pt ports.



System operational Status indication
The rack mounting ADTS 405 features in the flightline ADTS 405F
Local operator keypad and display readout
Remote operation by hand terminal or computer interface
ADTS 405 rack mount

Instrument operation

All the instruments can be controlled directly via the membrane keypad/display on the front panel. A remote control terminal for cockpit/flight deck operation is supplied as standard (optional for ADTS 405). This enables a single person to complete the entire test program, while conveniently seated in the aircraft.

A wide range of calibrations and simulations can be performed that monitor and control Ps, Pt, Qc, Mach, Rate of Climb, EPR. The instrument can be scaled in numerous units including ft, knots, inHg, mbar, psi, inH2O. In addition Mach or airspeed can be held constant while altitude is controlled.

The ADTS 405 series is specifically designed to ensure that the instrument or aircraft system under test cannot be damaged.

Test Program Management

Optional test program manager (TPM) software enables the system to be run directly from a PC such as a laptop. This feature permits complex test routines to be stored, actioned and resulting data formatted as required.

The TPM allows programs to be downloaded from a PC and stored internally within the instrument, reducing the need for bulky manuals and test routines in the confined space of the cockpit.

The Preferred Choice of the Military

Military authorities throughout the world have adopted the ADTS 405F variant as standard equipment such as:



US Army
NSN 4920-01-388-6790

US Navy
NSN 4920-01-449-8072



UK RAF
NSN 6625-99-567-0696

Remote Control Terminal

The remote control terminal is a rugged handheld unit that provides the operator with all the display and keypad facilities featured on the ADTS 405 front panel. Operation from the flightdeck is then possible by a single operator. A 18 m (59 ft) and a 2 m (6.5 ft) cable are supplied as standard. Examples of the many keypad functions are listed below:

ALT/Ps

Altitude read and value entry.

Speed/QC

Airspeed read and value entry. Mach/PtMach number.

EPR

Engine Pressure Ratio test (Ps/Pt for inlet/exhaust).

RoC/Ps Rate

Rate of climb, rate of speed entry and timing display.

Rate Timer

Select timing for RoC testing or leak testing.

Hold

Freeze control value to 'on state' at current conditions.

Rate

Rate control for Pt channel.

Leak Measure/Control

Select Measure or Control Mode—start up in measure mode.

Ground

Controlled vent to ground and read QFE/QNH.

Local/Remote

Control/transferred to ATE/IEEE 488.

Port

Select multi-outputs on Ps and Pt if fitted.

Print

Print displayed values if printer connected.

Execute Test Program

Manual stepping when in-built TPM program.

Help

Provides advice to operator on control procedures as required.

Set Up

Select units, limits, local conditions, display format, etc.



ADTS 405 Specifications

Parameter	Operating Range	Resolution	Accuracy	Repeatability
Altitude	-914 to 24,384 m ⁽²⁾ (-3,000 to 80,000 ft)	0.3 m (1 ft)	0.9 m at sea level ⁽¹⁾ (3 ft at sea level)	±0.3 m (±1 ft)
			2.1 m at 9144 m(1) (7 ft at 30,000 ft)	±0.61 m (±2 ft)
			8.8 m at 18,288 m(1) (29 ft at 60,000 ft)	±2.1 m (±7 ft)
Static Sensor	35 ⁽³⁾ to 1355 mbar absolute (1 to 40 inHg)	0.01 mbar (0.0003 inHg)	±0.1 mbar (±0.003 inHg)	±0.05 mbar (±0.0015 inHg)
Airspeed	10 to 850 knots ⁽⁴⁾ or 10 to 1,000 knots	0.1 kts 0.1 kts	±0.5 kts at 50 kts	±0.4 kts
			±0.07 kts at 550 kts	±0.02 kts
			±0.05 kts at 1,000 kts	±0.02 kts
Pitot Sensor	35 ⁽³⁾ to 2700 mbar absolute (1 to 80 inHg) 35 ⁽³⁾ to 3500 mbar absolute (1 to 103 inHg)	0.01 mbar (0.0003 inHg) 0.01 mbar (0.0003 inHg)	±0.012% RDG +0.007% FS	0.05 mbar rising to 0.17 mbar (0.0015 inHg rising to 0.005 inHg)
Rate of Climb	0 to 6000 ft/min ⁽³⁾	1 ft/min	±1% of value	±0.5%
Mach	0.6 to 10.000 ⁽⁴⁾	0.001	Better than 0.005	0.001 rising to 0.005
Engine Pressure Ratio (EPR)	0.1 to 10	0.001	Better than 0.005	



Scaling Factors

- Altitude: ft metres
- Airspeed: knots, km/hr, mph
- Others: mbar, inHg, inH2O (4°C, 20°C, 60°F), mm Hg, kPa, hPa, psi.
- Airspeed: CAS (calibrated) : TAS (true—ability to enter temperature)

Rate Control/Indication

- RoC: Rate of Climb
- Rt Ps: Rate of Static
- Rt Pt: Rate of Pitot
- Rt Qc Rate of Pt-Ps
- Rt CAS: Rate of calibrated airspeed
- Rt EPR: Rate of engine pressure ratio

Overpressure

Negligible calibration change with up to 1.25 x FS overload applied.

Calibration Stability

Better than 50 ppm per year

Recalibration

Simple keypad instruction. 12 month interval suggested. Use of primary standard pressure reference is recommended (e.g. Ruska Model 2465 deadweight tester).

1. Accuracy at ambient 5°C to 35°C (41°F to 95°F) for -10° to +50°C (14° to 122°F) x 1.5 for ±2°C (±1.1°F) lab use x 0.5
2. 32,004 m (105,000 ft) available (control with suitable vacuum pump).
3. 30,480 m (100,000 ft/min) rates selectable—limit protected for safety—volume dependent
4. Limits settable to prevent excessive mach. (Civil limit Mach 1).

Rackmounted ADTS 405

The ADTS 405 is a 50 cm (19 in) rack mounting module housing the main control system with local front panel display and keypad. The remote hand terminal is optional for this model and a matched separate pressure/vacuum supply unit is available—please refer to PV 103R Datasheet.

ADTS 405 Rack Specifications

Display

LCD backlit, supertwist/wide angle viewing. 123 mm x 42 mm (4.8 in x 1.6 in) window with 4 lines of 20 characters 8 mm (0.3 in) high. Optional hand terminal display window 73 mm x 24 mm (2.87 in x 0.95 in)

Response

- Two readings per second display value update.
- Five readings per second remote interface updates.

Power Supplies

90 to 130 VAC at 47 to 440 Hz ,180 to 260 VAC at 47 to 63 Hz, 100 VA normal, 400 VA maximum. 2 m minimum IEC connector lead supplied.

Power Failure Protection

In the event of a power interruption, the output ports will be vented to ambient conditions safely. On power reconnect, the system is in measure mode.

Self Test

Integral test routines and reporting for both electrical and pneumatic systems.

Digital Interfaces

Parallel printer interface available as standard. IEEE488.2 optional—earlier versions also available.

Temperature Range

- Calibrated: 5°C to 35°C (41°F to 95°F)
- Operating: -10°C to 50°C (14°F to 122°F)
- Storage: -20°C to 70°C (-4°F to 158°F)

Sealing

ADTS 405 front panel is rainproof.

Humidity

0 to 90% condensing. "Tropicalised" pcb's to MIL-T-28800

Shock/Vibration

MIL-T-28800 Class 2.

Safety Performance

- EN50081-1 for EMC emissions
- EN50082-1 for EMC immunity
- EN61010 for electrical and mechanical safety

Physical

- 13 kg (29 lb) nominal.
- Case dimensions: 485 mm x 270 mm x 305 mm (19 in x 10.5 in x 12 in)

Pneumatic Connections

Front panel mounted fittings with blanking caps

- Static: AN-6 37° flare + 10m (33ft) red mating hose
- Pitot: AN-4 37° flare + 10m (33ft) blue mating hose

Fitted with replaceable filter

Vacuum (AN6) and pressure (AN4) supply fittings on rear panel with 15 m (50 ft) long mating hoses (green and yellow).

Pneumatic Supplies

For normal use, dry air with source pressure at a maximum 25% above specified pressure range. Compatibility with other dry, non-corrosive gases can be provided. Please refer to GE.

Flight line ADTS 405F

Transportable military cased version incorporating the ADTS 405 with built-in pressure/vacuum supplies. Control is via local keypad/display or standard remote control terminal.

Power Supply

90 to 130 VAC at 47 to 440 Hz , 180 to 260 VAC at 47 to 63 Hz, 500 VA. 28 VDC option available. 5 m (16 ft) waterproof connector cable supplied

Digital Interfaces

Standard parallel printer connection accessible via front panel protection cover. IEEE488 optional.

Sealing

Weatherproof in operating mode (lid removed).

Electro Magnetic Compatibility

To MIL-STD-461F

Physical

- 35 kg (77 lb)
- 762 mm x 320 mm x 480 mm (30 in x 13 in x 19 in) nominal. Wheels supplied for ease of transport.

Pressure/Vacuum Unit

Integral pneumatic supplies. Auxiliary connections for external supplies to boost or drive other equipment. Supply for vacuum hold down static adaptors also provided.

ADTS 405C Specifications

Power Supply

As ADTS 405F with 10 m (33 ft) AC power lead.

Hoses

4x 10m red + 4x 10m blue

Sealing

Weatherproof with all doors closed.

Physical

- Weight: 250 kg (550 lb)
- Size (h x l x w): 1150 mm x 1350 mm x 700 mm (45 in x 53 in x 27 in) nominal.

Towing

Maximum safe speed 15 km/h (10 mph). Foam filled wheels 381 mm (15 in) diameter and a steering wheel 254 mm (10 in) diameter, nominal.

Options

(A) ADTS 405 Remote Control Terminal

A handheld remote control facility for the rack mount ADTS 405 (standard with ADTS 405F/ADTS 405C). Complete with 2 m (6 ft) and 18 m (60 ft) long cables.

(B) Lid Mounted Switching Manifold

Two five-way manifolds for multiple output Ps and Pt ports. Each line has an individual manual shut-off valve.

(C) 28 VDC Operation

In addition to AC supply, a second power connector enables 28 VDC input for rack, flightline or cart versions.

(E1) IEEE488 Interface (SCPI version)

Current ADTS communications protocol.

(E2) IEEE488 Interface (1975 version)

Compatible with earlier ADTS units.

(E3) IEEE488 Interface (SCPI & 1975)

Both (E1) and (E2) provided for user choice.

(F) ADTS 405 Rear Ps/Pt Connections

Duplicate connections provided at the rear in addition to front panel.

(G) Test Program Manager

A software package with serial interface mode adaptor. Permits laptop PC based control.



(H) Altimeter Encoder Interface

For altimeters with ICAO reporting encoders. Permits display of the bit stream and reporting of altitude value.

Related Products



For use with the ADTS 405, the PV103R is a 19" rack mounting module for ATE systems and features low maintenance dry pumps.

Accessories

Additional power cable and output hose styles are available, please inquire. Operators manual and calibration certificate also supplied as standard.

Calibration Standards

Instruments manufactured by GE are calibrated against precision calibration equipment traceable to international standards.

ADTS 405 Specifications

Ordering Information

Please state the following (where applicable):

1. Basic model number ADTS 405
2. Options and related products if required.
- 3.. Supporting Services (order as separate items)

Supporting Services

GE provides services to enhance, support and complement the Aviation GSE range. Our highly trained staff can support you, no matter where you are in the world. Further details can be found in www.gesensing.com/productservices/service.htm

Pressure Measurement Training

GE Sensing's training and education program offers comprehensive standard and customized curricula focusing on operation, application, maintenance and technology.

Classes can be held at various locations, your local facility or through on-line delivery. Quality training enables your engineers & technicians to optimize your business' performance.

- Personalized solutions to meet your needs
- Classes led by trained and experienced instructors
- Measurement technology and product specific training offerings

Nationally Accredited Calibration Certificates

New product is supplied with factory calibration certificates with measurements traceable back to international standards. For applications where initial nationally accredited calibration certificates are required or periodic re-calibration is desired, GE Sensing can provide the solution.

Extended Warranty Terms

New product is supplied with an industry benchmarked initial warranty. For peace of mind, particularly if final installation is months away from your product purchase, extend coverage on your equipment beyond the initial period up to 4 years term.

- Improved cost predictability
- Increased assurance

Multi-year Calibration and Repair Services Agreements

Available for indicators and instruments, multi-year service agreements increase cost predictability by providing fixed rates for extended periods. With larger scope undertakings customized plans can be adapted to your needs.

Rental

GE's rental program offers a simple, quick and affordable solution for unexpected measurement need. Rentals allow customers to be fully operational when challenges that are not foreseen arise. Assisting our customers in meeting peak demands, unexpected situations, evaluations and also to minimise downtime of important processes a wide range of measurement, test and calibration equipment is available on a short-term rental basis...from pressure indicators to portable calibrators and sophisticated air data test systems. The rental fleet is available from inventory, Factory tested & calibrated with a minimum rental period only 1 week. With larger scope undertakings any product can be made available for rental.

Maintenance

Should your equipment need maintenance our global repair facilities are happy to serve. Work is conducted by trained approved technicians, using controlled original equipment parts and procedures so restoring the product to design condition. This is particularly important with Intrinsically Safe products operated in hazardous environments and aviation ground support equipment.



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