

# ADTS 405 MkII

## Druck Air Data Test System

Design History with TERPS Innovation



BHGE 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 BHGE'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 TERPS sensor suitable for testing RVSM aircraft
- Flightline and rack mount versions
- Civil and military specifications
- Integral or remote pressure/vacuum supplies
- Fully programmable for aircraft type
- Protection for aircraft instruments
- Fully CE and ROHS II compliant
- 2 year warranty as standard

The ADTS 405 MKII 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 MKII 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 MKII 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 two formats:

#### **ADTS 405 - Rack Mounted Unit (RS)**

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 (FS/ FX/LS/LX)**

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 405 Rack Mount**

- 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

### **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 405RS). 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 and 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.

## 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 4920-01-656-6280



**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.

18 m (59 ft) and a 2 m (6.5 ft) cables are supplied as standard. There is also a 50m cable option available. 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

Prints to internal memory.

### 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 MkII Specifications

Parameter	Operating Range	Resolution	Accuracy
<b>Altitude</b>	-914 to 24,384 m <sup>(2)</sup> (-3,000 to 80,000 ft)	0.3 m (1 ft)	0.9 m at sea level <sup>(1)</sup> (3 ft at sea level)  2.1 m at 9144 m <sup>(1)</sup> (7 ft at 30,000 ft)  8.8 m at 18,288 m <sup>(1)</sup> (29 ft at 60,000 ft)
<b>Static Sensor</b>	35 <sup>(3)</sup> to 1355 mbar absolute (1 to 40 inHg)	0.01 mbar <sup>(1)</sup> (0.0003 inHg)	±0.1 mbar (±0.003 inHg)
<b>Airspeed</b>	10 to 850 knots <sup>(4)</sup> or 10 to 1,000 knots	0.1 kts  0.1 kts	±0.5 kts at 50 kts  ±0.07 kts at 550 kts  ±0.05 kts at 1,000 kts
<b>Pitot Sensor</b>	35 <sup>(3)</sup> to 2700 mbar absolute (1 to 80 inHg)  35 <sup>(3)</sup> to 3500 mbar absolute (1 to 103 inHg)	0.01 mbar (0.0003 inHg)  0.01 mbar (0.0003 inHg)	±0.2 mbar  ±0.26 mbar
<b>Rate of Climb</b>	0 to 6000 ft/min <sup>(5)</sup>	1 ft/min	±1% of value
<b>Mach</b>	0.6 to 10.000 <sup>(4)</sup>	0.001	Better than 0.005
<b>Engine Pressure Ratio (EPR)</b>	0.1 to 10	0.001	Better than 0.005

1. Accuracy includes non-linearity, hysteresis and repeatability over the full operating temperature range, 12 months drift and calibration standard uncertainty.
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 5).

## Rack Mounted ADTS 405

The ADTS 405RS 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.

### Scaling Factors

- Altitude: ft, metres
- Airspeed: knots, km/hr, mph
- Pressure: mbar, inHg, inH<sub>2</sub>O (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.



### Control Stability

Better than 40 ppm.

### Recalibration

Simple keypad instruction. 12 month interval suggested. Use of primary standard pressure reference is recommended. Recalibration can be done on nitrogen or air (See media compatability).



# ADTS 405 Rack Specifications

## Display

VFD Display , 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

- 100/120/230 Vac, 50/60 Hz
- 115 Vac 400 Hz
- Power consumption upto 400VA

## 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

IEEE488.2 optional - Earlier versions also available.

## Temperature Range

- Operating:-20°C to 60°C (-4°F to131°F)
- Storage:-51°C to 71°C (-60°F to160°F)

## Sealing

ADTS 405 MkII front panel is rainproof.

## Humidity

0 to 100% condensing. "Tropicalised" pcb's to MIL-T-28800

## Shock/Vibration

- MIL-PRF-28800 Class 2

## Safety Performance

- EN61010 for electrical and mechanical safety

## Electromagnetic Compatibility

- EN 61326-1

## 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
- Pitot: AN-4 37° flare

*Fitted with replaceable filter*

Vacuum (AN6) and pressure (AN4) supply fittings on rear panel

Rear mounted Static AN-6 and Pitot AN-4 (Option)

## Pneumatic Supplies

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

## Media Compatibility

Non-condensing dry gases compatible with 316L Stainless Steel, Silicon, Silicon dioxide, Fluorosilicon RV adhesive and glass

# 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

- 100/120/230 Vac, 50/60 Hz
- 115 Vac 400 Hz
- Power consumption upto 500VA

## Digital Interfaces

- IEEE488 Optional - Earlier versions also available.
- Ethernet and USB options available shortly.

## Temperature

### Flight line (FS/LS)

- Operating: -20°C to 55°C (-4°F to 131°F)
- Storage: -51°C to 71°C (-60°F to 160°F)

### Extended (FX/LX)

- Operating: -40°C to 55°C (-40°F to 131°F)
- Storage: -51°C to 71°C (-60°F to 160°F)

## Humidity

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

## Shock/Vibration

- MIL-PRF-28800 Class 2

## Sealing

Weatherproof in operating mode (lid removed).

## Electromagnetic Compatibility

To MIL-STD-461F for Extended case (FX and LX Option) & EN61326-1

## Lid Line Switching Unit (LS and LX Option)

Lid line switching unit offers customers the option of two five-way manifolds for multiple output ports, consists of 5 Static AN6 and 5 Pitot AN4 manually switched ports.

## Safety Performance

EN61010 for Electrical and Mechanical safety

## 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.

# Related Products



## Pressure/Vacuum Supply Unit

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, safety manual and calibration certificate also supplied as standard.

## Calibration Standards

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

# ADTS 405 MkII Specifications

## Supporting Services

BHGE 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](http://www.gesensing.com/productservices/service.htm).

Training available on request.

## 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, BHGE 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

BHGE'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.



# Ordering Information

## Part Numbering String

Model Type

ADTS405MK2 Pitot Static Tester

### Case Style

- RS - RS: Controller Rack Only
- FS - FS: Flightline Case Standard
- FX - FX: Flightline Case Extended
- LS - LS: Flightline Case Standard with Line switching Unit \*
- LX - LX: Flightline Case Extended with Line switching unit \*

### Airspeed (CAS) Range

- A1 - A1: 850 knots CAS range Front
- A2 - A2: 1000 knots CAS range Front
- A3 - A3: 850 knots CAS range Rear
- A4 - A4: 1000 knots CAS range Rear

### Power Input

- C1 - C1: Universal AC Input Power
- C2 - C2: AC or DC Input Power

### Communication Ports

- D1 - D1: GPIB, Ethernet, USB, RS232
- D2 - D2: All D1 + Sperry (Rear)

### Aircraft Bus

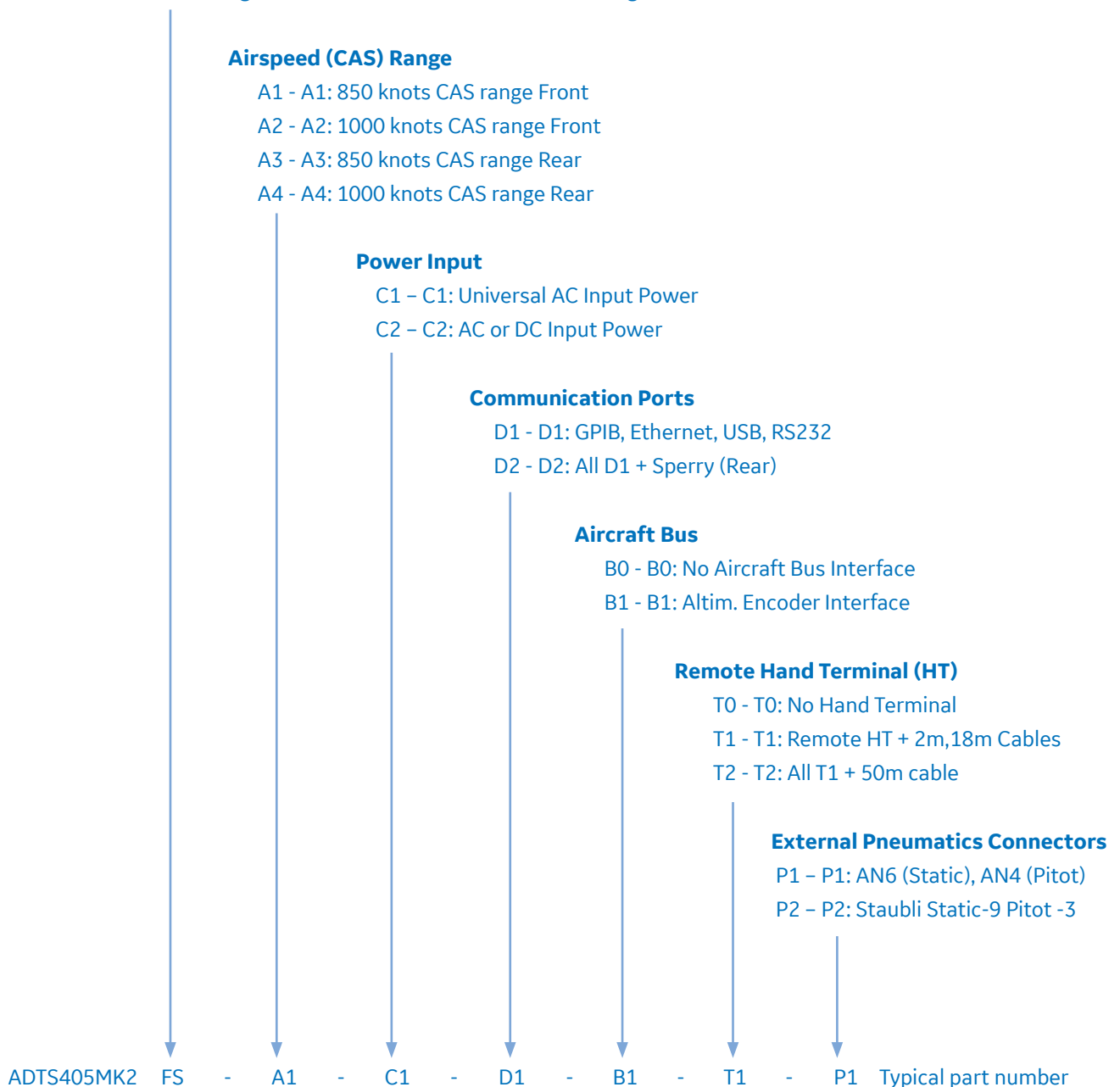
- B0 - B0: No Aircraft Bus Interface
- B1 - B1: Altim. Encoder Interface

### Remote Hand Terminal (HT)

- T0 - T0: No Hand Terminal
- T1 - T1: Remote HT + 2m,18m Cables
- T2 - T2: All T1 + 50m cable

### External Pneumatics Connectors

- P1 - P1: AN6 (Static), AN4 (Pitot)
- P2 - P2: Staubli Static-9 Pitot -3



\* Line switching unit consists of 5 Static AN6 and 5 Pitot AN4 manually switched ports.

# Accessories

AA405F-1	Power Cable 2m UK
AA405F-2	Power Cable 10m UK
AA405F-3	Power Cable 2m USA
AA405F-4	Power Cable 10m USA
AA405F-5	Power Cable 2m Europe
AA405F-6	Power Cable 10m Europe
AA405F-7	Power Cable 2m Australia & New Zealand
AA405F-8	Power Cable 10m Australia & New Zealand
AA405F-9	Power Cable 2m India
AA405F-10	Power Cable 10m India
AA405F-11	Power Cable 2m China
AA405F-12	Power Cable 10m China
AA405F-13	Power Cable 2m South Africa
AA405F-14	Power Cable 10m South Africa
AA405F-15	Power Cable 2m Japan
AA405F-16	Power Cable 10m Japan
AA405F-17	ADTS405 MK2 PRESSURE CONN AN4 ROUND
AA405F-18	ADTS405 MK2 PRESSURE CONN AN6 ROUND
AA405F-30	IEC Power Cable 2.5m to UK Style, BS1363
AA405F-31	IEC Power Cable 2.5m to USA/Canada style, NEMA 5-15P
AA405F-32	IEC Power Cable 2.5m to European style, Schuko CEE 7/7
AA405F-33	IEC Power Cable 2.5m to Australia/New Zealand style
AA405F-34	IEC Power Cable 2.5m to India style, IS 1293 (IA16A3, BS546)
AA405F-35	IEC Power Cable 2.5m to China style, GB 15934
AA405F-36	IEC Power Cable 2.5m to South Africa style, SANS 164-1
AA405F-37	IEC Power Cable 2.5m to Japan style, JIS 8303 (NEMA 5-15P)
AA500F-17	Black Hose (please state length in meters or feet)
AA500F-19	Red Hose (please state length in meters or feet)
AA500F-20	Blue Hose (please state length in meters or feet)
AA500F-21	AN3 Female hose connector
AA500F-22	AN4 Female hose connector
AA500F-23	AN6 Female hose connector
AA500F-24	Staubli Male hose connector Kit

