ADTS 405

ADTS 405 Series

Druck

Air Data Test Systems

- High accuracy
- RSVM compatible
- Flightline and rack mount versions
- Civil and military specifications
- Integral or remote pressure/vacuum supplies
- Fully programmable for aircraft type
- Single operator, ground or cockpit
- Protection for aircraft instruments

ADTS 405 Series

Air Data Test Systems

Druck 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.

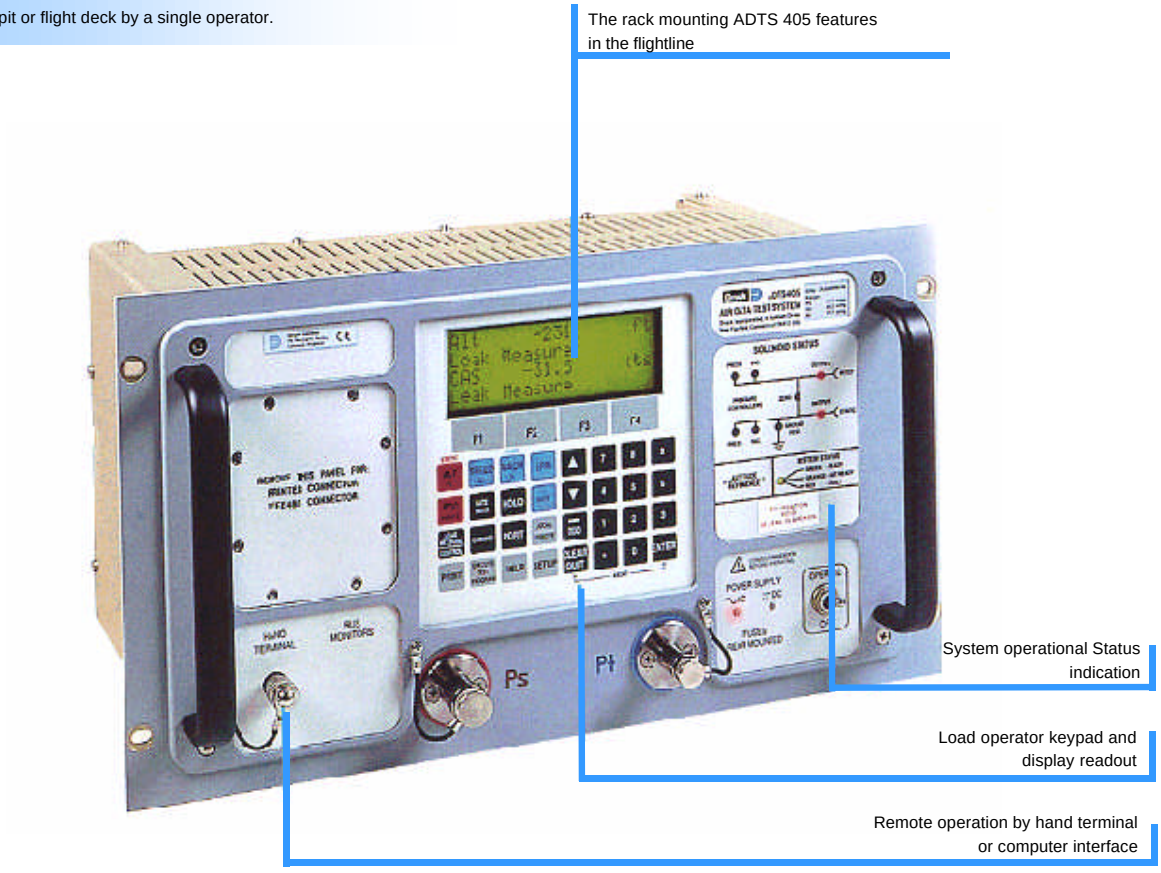
The ADTS 405 is the latest in a series of reliable, high accuracy, air data test systems. The rugged, compact design has evolved as a result of Druck's continuous research and development, customer feedback and experience gained from manufacturing thousands of automatic pressure controllers. This has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

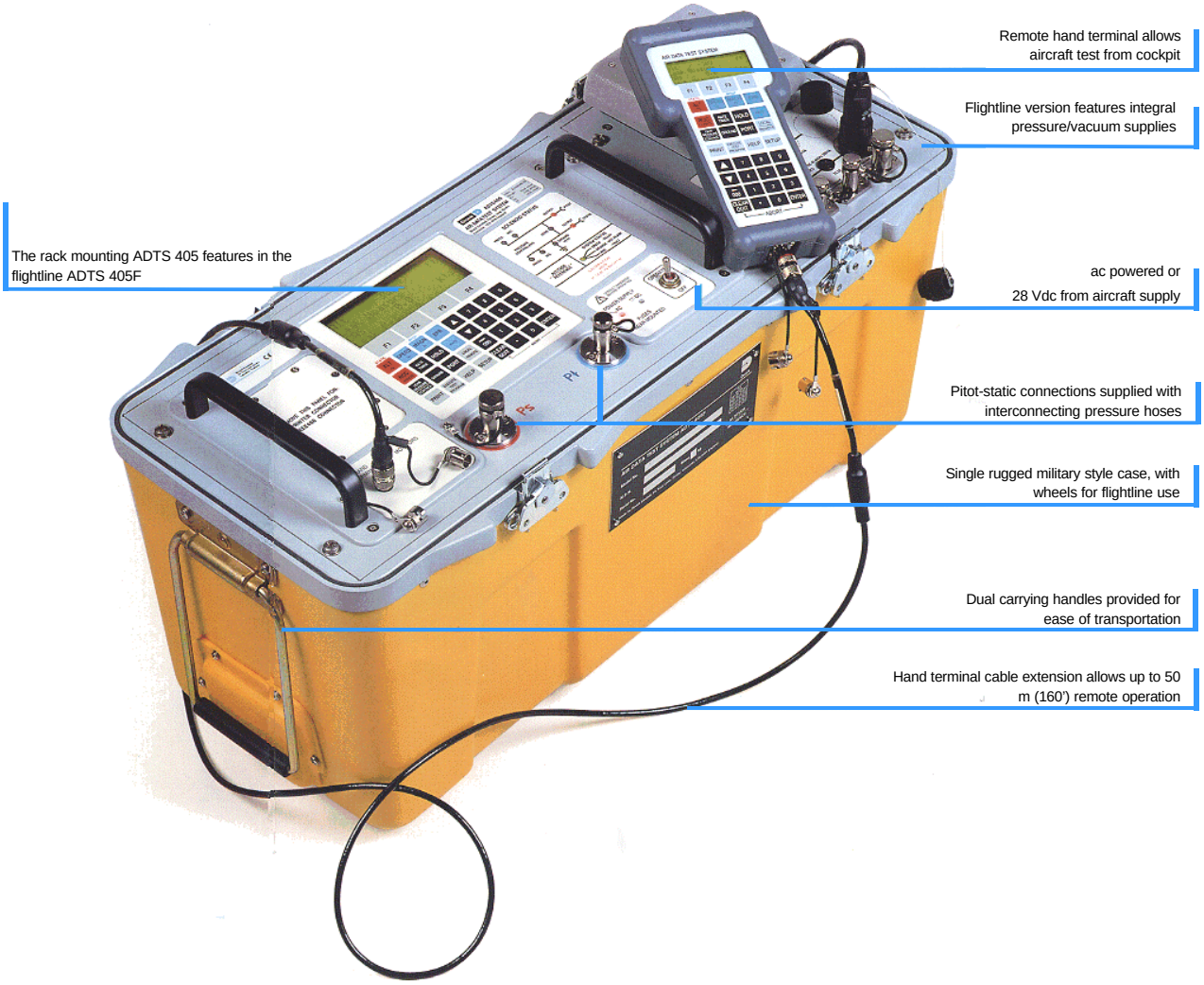
The ADTS 405 series is a proven world leader and industry standard specified by many:

- National and international civil airlines
- Military forces
- Aircraft manufacturers
- Ground support organizations
- 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.




Remote hand terminal allows aircraft test from cockpit
Flightline version features integral pressure/vacuum supplies
The rack mounting ADTS 405 features in the flightline ADTS 405F
ac powered or 28 Vdc from aircraft supply
Pitot-static connections supplied with interconnecting pressure hoses
Single rugged military style case, with wheels for flightline use
Dual carrying handles provided for ease of transportation
Hand terminal cable extension allows up to 50 m (160') remote operation

ADTS 405 Series

Air Data Test Systems

This versatile instrument can be supplied in three formats:

- **ADTS 405 - RACK MOUNTED UNIT**
- **ADTS 405F - TRANSPORTABLE FLIGHTLINE UNIT**
- **ADTS 405C - TOWABLE CART UNIT**

ADTS 405 - RACK MOUNTED UNIT

This is a compact, 19" 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 which 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.

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, whilst conveniently seated in the aircraft.

A wide range of calibrations and simulations can be performed which monitor and control Ps, Pt, Qc, Mach, Rate of Climb, EPR. The instrument can be scaled in numerous units including ft, knots, in Hg, mbar, psi, in H20. In addition Mach or airspeed can be held constant whilst 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

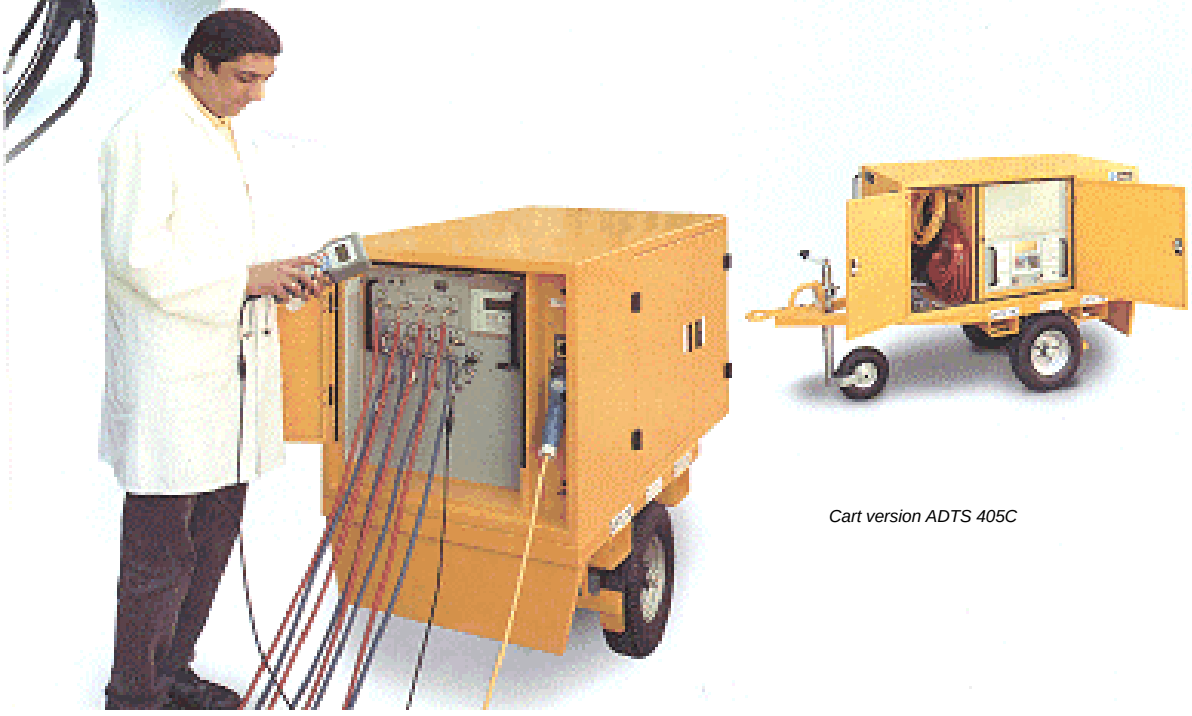
UK RAF

NSN 6625-99-567-0696

REMOTE CONTROL TERMINAL

The remote control terminal is a rugged handheld unit which 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. An 18m long and a 2m long 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/Pt	Mach number.
EPR	Engine Pressure Ratio test (Ps/Pt for inlet/exhaust.)
RoC/Ps Rate	Rate of Climb value 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/	Select Measure or Control Mode
Control	- 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 of inbuilt TPM program.
Help	Provides advice to operator on control procedures as required.
Set Up	Select units, limits, local conditions, display format, etc.



Cart version ADTS 405C

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MEASUREMENT SPECIFICATION

PARAMETER	OPERATING RANGE	RESOLUTION	ACCURACY	REPEATABILITY
Altitude	-3,000 to +80,000 ft(2)	1 ft	±1ft ±2ft ±7ft	
Static Sensor	35 to 1355 mbar abs (1 to 40 in Hg)	0.01 mbar (0.0001 in Hg)	±0.1 mbar (±0.003 in Hg)	±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 ±0.07 kts at 550 kts ±0.05 kts at 1,000 kts	±0.4 kts ±0.02 kts ±0.02 kts
Pitot Sensor	35 to 2700 mbar abs (1 to 80 in Hg) or, 35 to 3500 mbar abs (1 to 103 in Hg)	0.01 mbar 0.0001 in Hg 0.01 mbar 0.0001 in Hg	±0.015% RDG +0.007% FS	0.05 mbar rising to 0.17 mbar 0.0015 in Hg rising to 0.005 in Hg
Rate of Climb	0 to 6000 ft/min(3)	1 ft/min	±1% of value	±0.5%
Mach	0 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	

Notes.

1. Accuracy at ambient 5° to 35°C
   For -10° to +50°C x 1.5.
   For ±2°C lab use x 0.5.
2. 105,000 ft available (control with suitable vacuum pump).
3. 100,000 ft/min rates selectable
   - limit protected for safety
   - volume dependant.
4. Limits settable to prevent excessive mach. (Civil limit Mach 1.)

RACKMOUNTED ADTS 405

The ADTS 405 is a 19" 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
Others	- mbar, in Hg, in H_20 (4°C, 20°C, 60°F), mm Hg, kPa, hPa, psi.
Alternatives	
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 2 x FS overload applied.

Calibration Stability
Better than 50ppm 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

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

Response
2 readings per second display value update.
5 readings per second interface and control system updates.

Power Supplies
90 to 260 Vac, 47 to 440 Hz.
100 VA normal, 400 VA max.

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 faults.

Digital Interfaces
Parallel printer interface available as standard.
IEEE488.2 optional - earlier versions also available.

Temperature Range

Calibrated	5° to 35°C
Operating	-10° to 50°C
Storage	-20° to 70°C

Sealing
ADTS 405 front panel is rainproof.

Humidity
0 - 90% condensing. "Tropicalised" pcb's to MILT-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 x 270 x 305 mm (19" x 10.5" x 12").

Pneumatic Connections
Front panel mounted fittings with blanking caps.

Static	- AN-6 37° flare
Pitot	- AN-4 37° flare

Fitted with replaceable filters
Vacuum (AN6) and pressure (AN4) supply fittings on rear panel with 2.5m (8') long mating hoses.

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 Druck.

FLIGHTLINE 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 - 260V ac, 47 to 440 Hz, 500 VA. 28V dc option available.

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-461D

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

Pressure/Vacuum Unit
Integral pneumatic supplies (PV 103F). Auxiliary connections for external supplies to boost or drive other equipment. Supply for vacuum hold down static adaptors also provided.

CART MOUNTED ADTS 405C

Towable, chassis mounted package incorporating the ADTS 405 with pressure/vacuum supplies and ability to include a Line Switching Unit (LSU) for multiple Ps and Pt outlets. For LSU please refer to separate Product Note. Control is via cart mounted display or standard remote hand terminal.

Power Supply
As ADTS 405F with 10m (33') retractable ac power lead.

Sealing
Weatherproof with all doors closed.

Physical
250 kg (550 lb) and 1150mm high x 1350mm long x 700mm wide (54" x 45" x 27") nominal.

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

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Air Data Test Systems

OPTIONS

(A) ADTS 405 Remote Control Terminal
A handheld remote control facility for the Rackmount ADTS 405 (standard with ADTS 405F/ADTS 405C). Complete with 2m (6') long cable.

(B) Lid Mounted Switching Manifold
Two 5 way manifolds for multiple output Ps & 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.

(D) ADTS 405 Bench Case
A case to enclose the ADTS 405 19in rack unit for benchtop use.

(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 and program download for resident test routines. Please refer to Product Note for further details.

(H) Altimeter Encoder Interface
For altimeters with ICAO reporting encoders. Permits display of the bit stream and reporting of altitude value.

(J) ARINC 429 Interface
Permits the ADTS to monitor data from an aircraft bus, display the 12 pitot static label information and transmit to the aircraft. Please refer to Product Note for further details.

ACCESSORIES

ac power lead - 5m length (16' approx) Ps + Pt hoses - 2.5m lengths (8' approx) Pressure/vacuum hoses (ADTS 405 only)

Operation manual and calibration certificate also supplied as standard.

CALIBRATION STANDARDS

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

Continuing development sometimes necessitates specification changes without notice.

RELATED PRODUCTS

Pressure/Vacuum Supply Unit
For use with the ADTS 405, the PV 103R is a 19" rack mounting module for ATE systems and features low maintenance dry pumps.

Line Switching Unit
Enabling automatic selection of multiple Ps and Pt outlets, the LSU 100 (rack version) or LSU 101 (flightline version) is available for use with Druck Air Data Test Systems.

Calibrators and Pressure Sensors
Druck offer a complete range of precision calibrators for the field, workshop or laboratory. These include primary and secondary pressure standards from Druck companies, Ruska Instrument Corporation and Pressurements. Druck also manufacture a wide range of pressure transducers and transmitters for ground/flight test and flight qualified applications.

Please refer to Druck for further information on these products.

ORDERING INFORMATION

Please state the following (where applicable):-

1. ADTS 405, ADTS 405F or ADTS 405C.
2. Pressure range required for Pt.
3. Minimum/maximum airspeed limits.
4. Options and related products if required.

Druck

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NAMAS CALIBRATION No. 0221

Representative