Instrument Expert
Original factory packaging
www.dorgean.com

Calibration Technology

Air Data Test Set
Model CPA8001

Data Sheet CPA8001

Applications

- Altitude / vertical air speed calibration
- Air speed calibration
- Calibration of air data computers
- Military, commercial, helicopter
- Research and development laboratories

Features

- Uncertainty: ± 2.5 ft, ± 0.06 knots
- RVSM Compliant
- Ps/Qc or Ps/Pt removable transducer
- One year calibration interval
- Two year warranty
- Automated zeroing function

Model CPA8001 - Air Data Test Set

Description

Application
The CPA8001 Air Data Test Set (ADTS) is an air data controller designed for automated calibration and testing of altimeters, rate of climb indicators, airspeed indicators and air data computers.

User Interface
The high definition color touch screen and intuitive interface provides for simultaneous or asynchronous control of altitude/altitude-rate, and/or airspeed/airspeed-rate. Entry of set points and system setting becomes second nature through the easy to understand buttons and menus. In addition, the user programmable sequence function provides storage and automated control of standard test procedures.

Remote Operation
Remote operation, via IEEE-488.2 (GPIB), Ethernet, RS232 or USB and command set emulation of non-Mensor ADTS devices makes the CPA8001 a valuable "drop-in" asset that can be used in production or calibration of air data instruments.

Sensors & Control
A dual (Ps/Pt or Ps/Qc) removable / interchangeable sensor is available, with an accuracy of 0.009% IS-50*. The requirements of RVSM specification are achieved with either sensor. User specified ranges are available for military, commercial or helicopter applications. The automated zeroing function adds another high accuracy absolute sensor within an automated zeroing system. This insures a high level of accuracy by automatically adjusting the zero for both channels. The percent of reading specification plus a proprietary control valve regulator, provides accurate, and stable control.
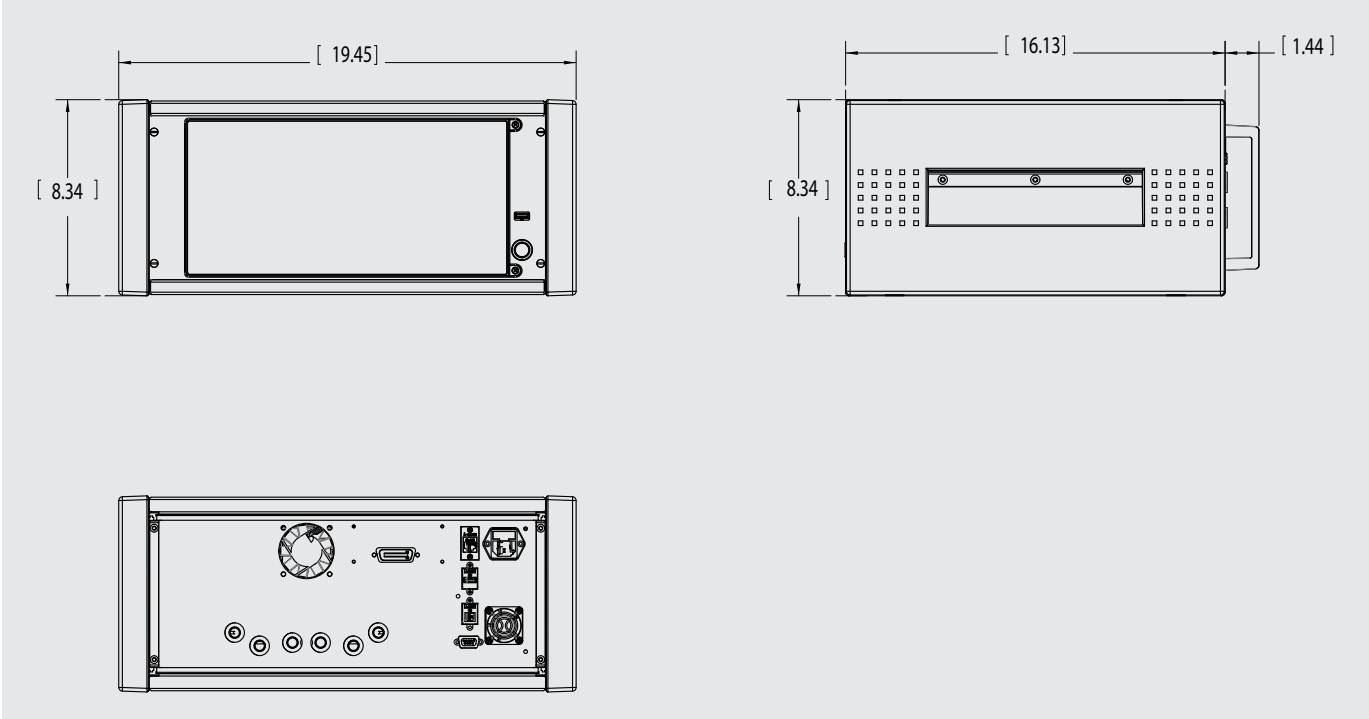
Service & Calibration
The CPA8001 can be supplied with an external "Calibration Sled" for remote calibration outside of the installed unit. Combined with Mensor's world class service and support, the CPA8001 is the best solution to air data calibration applications.
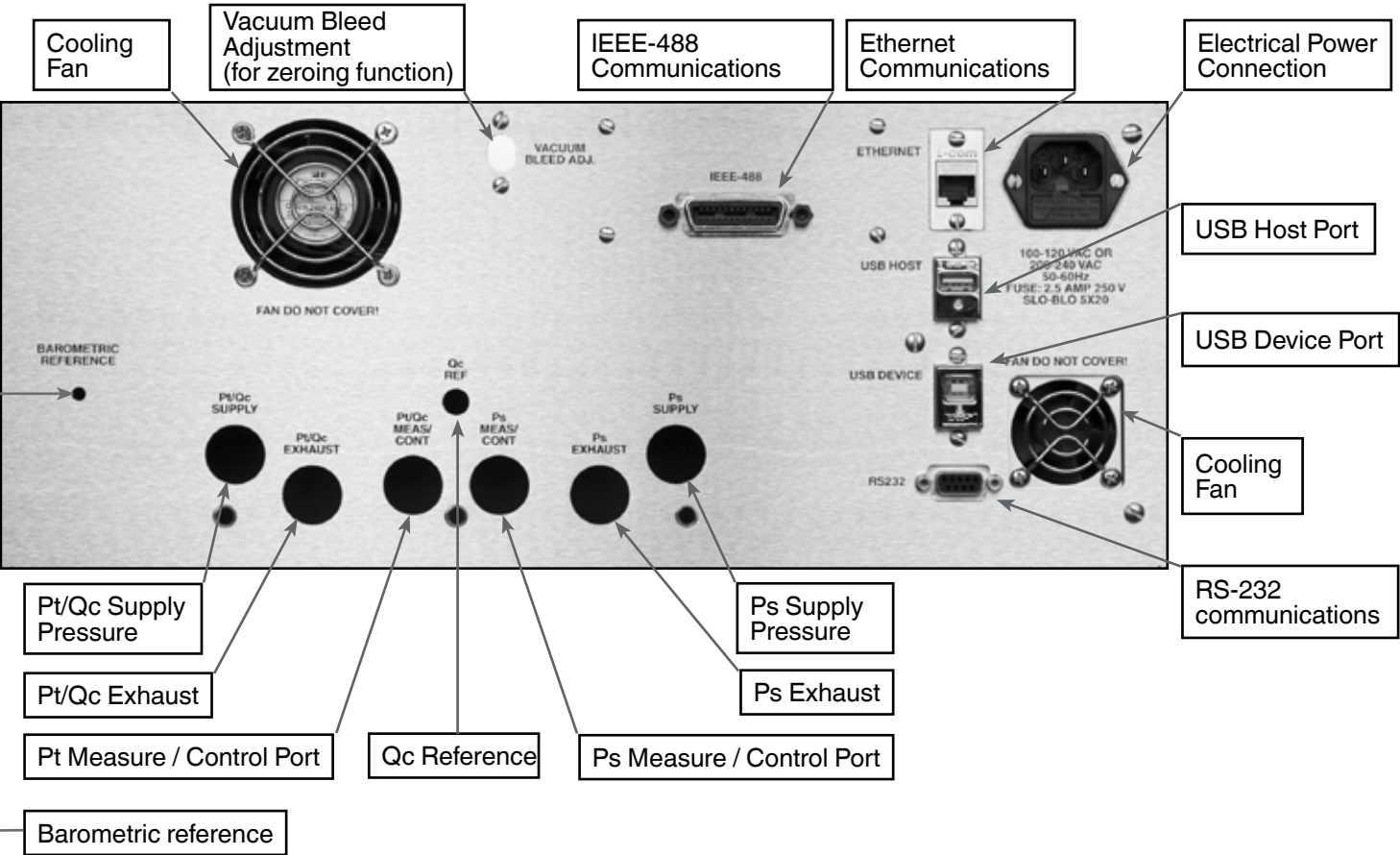
* See page 3 "Specifications"

Dimensions

Dimensions are in Inches

[19.45]

[8.34]

[16.13]   [1.44]

[8.34]

Back Panel

Cooling Fan

Vacuum Bleed Adjustment (for zeroing function)

IEEE-488 Communications

Ethernet Communications

Electrical Power Connection

VACUUM BLEED ADJ.

IEEE-488

ETHERNET

USB Host Port

100-120 VAC OR 200-240 VAC 50-60Hz FUSE: 2.5 AMP 250 V SLO-BLO 5X20

FAN DO NOT COVER!

USB HOST

USB DEVICE

USB Device Port

FAN DO NOT COVER!

BAROMETRIC REFERENCE

Qc REF

Ps SUPPLY

Cooling Fan

Pt/Qc SUPPLY

Pt/Qc EXHAUST

PU/Qc MEAS/ CONT

Ps MEAS/ CONT

Ps EXHAUST

RS232

Pt/Qc Supply Pressure

Ps Supply Pressure

RS-232 communications

Pt/Qc Exhaust

Ps Exhaust

Pt Measure / Control Port

Qc Reference

Ps Measure / Control Port

Barometric reference

Specifications

Ps Sensor	0 ... 29.5 to 0 ... 37 (0 ... 950 to 0 ... 1253) in HgA @ 0°C (mbar)
Measurement Uncertainty [2]	0.009% IS-50 [1]
Pt Sensor	0 ... 40 to 0 ... 110 (0 ... 1355 to 0 ... 3725) in HgA @ 0°C (mbar)
Measurements Uncertainty [2]	0.01% IS-50 [1]
Qc Sensor	-1 ... 3 to -1 ... 100 (-34 ... 100 to -34 ... 3386) in HgD @ 0°C (mbar)
Measurement Uncertainty [2]	0.01% Full Span
Barometric reference range	17 to 34 (575 to 1151) in HgA @ 0°C (mbar)
Measurement Uncertainty [2]	0.01% R
Vacuum reference range	100...1000 mtorr
Measurement Uncertainty [2]	0.4% R

	0.009% IS-50 Ps Sensor 0...32 in HgA	0.009% IS-50 Ps Sensor 0...34 in HgA
Altitude uncertainty	Sea level ± 2.5 ft	Sea level ± 2.5 ft
	29000 ft ± 3.4 ft	29000 ft ± 3.6 ft
	41000 ft ± 5.7 ft	41000 ft ± 6 ft

	0.009% IS-50 Ps Sensor 0...32 in HgA	0.009% IS-50 Ps Sensor 0...34 in HgA
Ps Pressure uncertainty	32 ± 0.0027 in Hg	34 ± 0.003 in Hg
	15 ± 0.0014 in Hg	15 ± 0.0015 in Hg
	5 ± 0.0014 in Hg	5 ± 0.0015 in Hg

	0.01% FS Qc Sensor -1...32 in Hg	0.01% FS Qc Sensor -1...80 in Hg
Airspeed uncertainty	250 ± 0.12 knots	250 ± 0.31 knots
	500 ± 0.05 knots	500 ± 0.13 knots
	661 ± 0.03 knots	661 ± 0.08 knots
		1000 ± 0.03 knots

Compensated temperature range	15 ... 45 Degrees C
Calibration stability (all ranges)	1 Year
Calibration adjustment	Zero adder and span multiplier, up to 11 point linerization for each sensor.
Calibration data storage	Calibration data is stored on each removable sensor.
Aviation Resolution	0.1 ft. and 0.1 knots
Pressure Resolution	4,5 or 6 Digits (selectable)
Orientation effects (for std. and opt. Sensors)	Negligible
Pressure units	psi, psf, osi, ATM, inH20@4C, inH20@20C, inH20@60F, mbar, bar, Dy/cm2, pascal, hPa, kPa, MPa, inHg@0C, inHg@60F, mTorr, Torr, mmHg@0C, cmHg@0C, MHg@0C, mmH20@4C, cmH20@4C, MH20@4C, mmH20@20C, cmH20@20C, MH20@20C, MSW, ftH20@4C, ftH20@20C, ftH20@60F, inSW, ftSW, tsi, tsf, gm/cm2, kg/cm2, kg/M2, + plus 2 user defined units (multiplier from psi or pascal)
Aviation units	Altitude: feet, meter, Airspeed units: knots, km/h, meter/s, mach

(1) 0.009% IS-50 (IntelliScale-50) = 0.009% of reading from 100% FS to 50% FS and 0.009% of 50% FS from 0% to 50% FS for 365 days.
(2) Measurement Uncertainty (k=2) includes hysteresis, linearity, repeatability, reference standard, drift and temperature effects over the calibrated range for the calibration interval specified, with periodic re-zeroing

Specifications

Control Specifications

Stability of controlled pressure Units	0.002 % Span

Altitude (ft.)	Altitude Stability (+/- ft.)	Airspeed (knots)	Airspeed Stability (+/- Knots)
-1870	0.56	0	4.684
0	0.59	10	1.042
5000	0.69	20	0.540
10000	0.80	30	0.363
20000	1.11	40	0.273
30000	1.58	50	0.218
40000	2.39	60	0.182
50000	3.88	70	0.156
60000	6.28	80	0.136
65000	7.99	90	0.121
		100	0.108
		200	0.052
		300	0.033

Stability of Controlled Avionics Units (label for table above)

Control Time	10 seconds to stable flag for a 10% pressure change into 150cc volume. Larger volumes can lengthen this time. Controlling to pressures less than 0.5 psia will lengthen this time.
Source pressure requirements [media]	10% over the range of the channel's transducer. [Clean, dry air (class 3 instrument air per ISO 8753) or nitrogen]
Minimum controlled pressure	0.05% FS or 0.025 psi over exhaust pressure, whichever is greater.
External volume recommendation	Maximum: 60 cu.in. (1000 cc) Minimum: 3 cu.in. (50 cc)

Mechanical

Size	See drawing on page 2
Weight	52 lbs. or 23.6 kg
Pneumatic interface	7/16-20 Female SAE threaded ports for Supply, Exhaust and Measure/Control ports. Hose barb for optional barometer and/or Qc reference.
Overpressure protection	Safety valves, scaled to 120% of full scale of each sensor.
Filters	20 micron, on all pressure ports except the Barometer and Qc reference.
Screen	HD color touch screen
Mounting	Handles are standard, 19 in. rack mount optional.

Electrical & Communications

Power supply	100-120 VAC or 200-240 VAC, 50-60 Hz
Communications interface	IEEE-488, RS-232 (null modem cable not required), Ethernet and USB

Environmental

Warm up	< 15 minutes
Operating temperature	15 to 35 Degrees C
Storage temperature	0 to 70 Degrees C
Humidity	35 to 85% RH - non-condensing

Approvals and Certificates

Logo	Description	Country
CE	**EU Declaration of Conformity** EU Importer: WIKA, 63911 Klingenberg, Germany	European Union
UKCA	**UKCA Declaration of Conformity** Importer: WIKA Instruments Ltd, Unit 6 & 7 Goya Business Park, The Moor Road, Sevenoaks Kent, TN15 5GY	Great Britain

Accuracy & Stability

The Total Uncertainty specification for a standard CPA8001 falls well within the uncertainty required for RVSM. In addition, the patented Needle Valve Regulator provides a steady and precise pressure control output that simulates Altitude / Altitude Rate and Airspeed / Airspeed Rate into large volumes.

Removable / Interchangeable Sensors

Removable and interchangeable sensors have become a hallmark for Mensor calibrators and controllers. Removable / interchangeable sensors provide continuous operation with virtually no down time. Sensors removed for calibration can be replaced by a freshly calibrated sensor in less than 5 minutes. The ability to remove a sensor for calibration and replace it with a freshly calibrated sensor while the instruments remains in service saves time and money. In addition, changing sensor ranges in the CPA8001 provides an expanded capability within a single calibrator.

CPA8001 Dual Transducer

Knots: IAS or TAS

Indication of Airspeed can be "Indicated Airspeed" (Knots IAS) or "True Airspeed" (Knots TAS).

Emulation / Drop-in Compatibility

The CPA8001 remote communication software can receive and understand commands intended for other ADTS units, including the Mensor 8201 and 8205. This provides drop-in emulation of aging or obsolete ADTS calibrators and requires no programming changes. Drop-in emulation saves time and money plus established processes and procedures can remain in place.

Touch screen & intuitive operator interface

The CPA8001 has an updated high definition color touchscreen with an intuitive menu structure and job specific screens that includes password protection. Setpoints for altitude, altitude rate, airspeed and airspeed rate are initially in a pending state and can be activated simultaneously. The "Favorites button" saves instrument sequences for easy recall. The display can be configured to show avionics and pressure units simultaneously.

Modular Design

Modular design simplifies servicing and saves time. The electronics, regulator and sensor package are self contained modules that require minimal service but on the occasion that service is required each component can be removed and easily replaced with a new or repaired module.
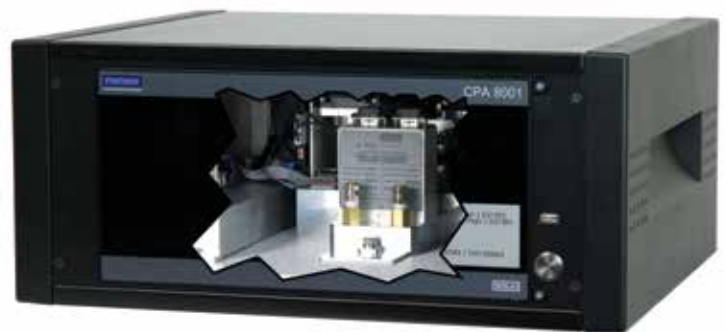
Auto Zero

The automated zeroing function utilizes a high accuracy low pressure absolute sensor. The Auto Zero sequence insures a high level of accuracy by automatically adjusting the zero for both channels.

Remote Recertification

The front panel of the CPA8001 Air Data Test Set contains a hinged door that can be opened using a Phillips Head screwdriver. The dual (Ps/Pt or Ps/ Qc) transducer can be removed by loosening a thumb screw and lifting it out of its captive cradle. The dual transducer can then be calibrated using the Remote Calibration Sled (Optional). After the sensor is calibrated it can be inserted back into the CPA8001 to resume operation.

CPA8001 Cutaway Transducer View

CPA8001 Remote Calibration Sled with Dual Transducer

An additional dual transducer can also be purchased in order to have a reserve transducer with a fresh calibration on hand to immediately replace the transducer requiring calibration. This feature virtually eliminates down time for the operation of the CPA8001 Air Data Test Set.

Main Screen

The main screen — altitude, altitude rate, airspeed, airspeed rate, setpoint entry

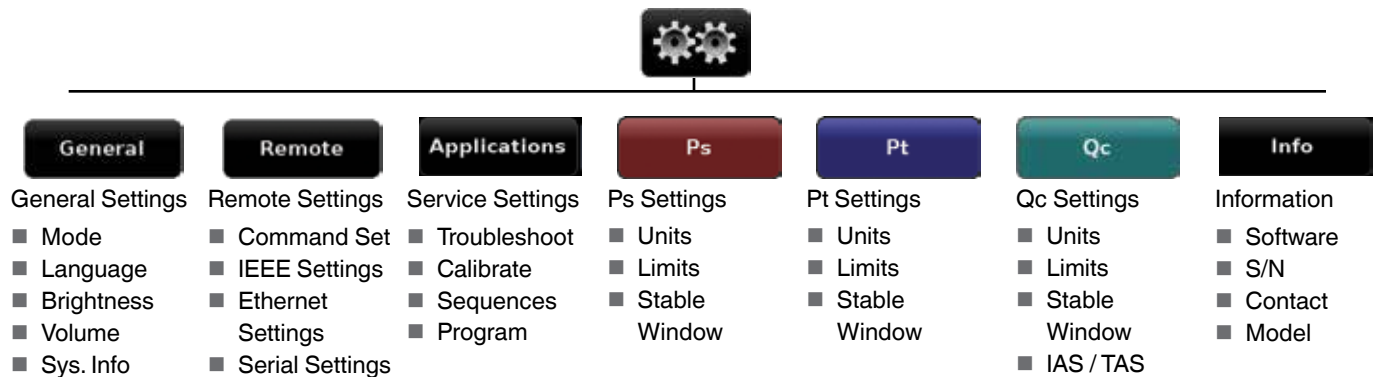|	
Ps-Altitude	Ps Altitude button: Provides quick access to the setup parameters of the Ps-Altitude Channel including units of measure, limits, and stable window.
Ps-Rate	Ps Rate button: Provides quick access to the setup parameters of the Ps-Rate channel including units of measure, limits, and stable window.
Setpoint	Setpoint button: Used to enter a setpoint for altitude, altitude rate, or the setpoint in pressure mode.
Qc-Airspeed	Qc Airspeed button: Provides quick access to the setup parameters of the Qc Airspeed channel including units of measure, limits, and stable window.
Qc-Rate	Qc Rate button: Provides quick access to the setup parameters of the Qc Rate channel including units of measure, limits, and stable window.
Setpoint	Setpoint button: Used to enter a setpoint for airspeed or airspeed rate or the pressure setpoint and rate in the pressure mode.
	Set-Up button: Provides access to all setup and configuration parameters.
	Data entry button: Provides a numerical data entry keypad for entering set points.
	Favorites/Sequences: Provides quick choice of pre-programmed sequences and standard operation routines (leak test).
	Green check mark is pressed to accept a pending set point or a group of pending set points.
	Back button: provides a way to erase the last digit entered.
	Delete button: erases the most recent data entry.
	Delete All button: erases all of the previously entered or pending entries.
Measure Control Vent	Operator control of calibrator mode to Measure, Control or Vent.
	Info/Status screen: Provides information on remote communication status, channel linkage, auto zero status and actuation, screen lock-out, and error status.

Setup and Configuration

Setup Screens
The CPA8001 setup screens provide a portal into the configuration of every aspect of the Air Data Test Set's operating environment. The tab driven menu provides easy access to the settings for the general instrument functions, the remote communication settings, password protected calibration functions, programming and the settings for the Ps, Pt and Qc channels. Access to all of these areas is controlled via a user configured password hierarchy.

General	Remote	Applications	Ps	Pt	Qc	Info
General Settings	Remote Settings	Service Settings	Ps Settings	Pt Settings	Qc Settings	Information
▪ Mode	▪ Command Set	▪ Troubleshoot	▪ Units	▪ Units	▪ Units	▪ Software
▪ Language	▪ IEEE Settings	▪ Calibrate	▪ Limits	▪ Limits	▪ Limits	▪ S/N
▪ Brightness	▪ Ethernet	▪ Sequences	▪ Stable	▪ Stable	▪ Stable	▪ Contact
▪ Volume	Settings	▪ Program	Window	Window	Window	▪ Model
▪ Sys. Info	▪ Serial Settings				▪ IAS / TAS	

Job Specific Operation and Password Protection

For the Operator:
The CPA8001 Air Data Test Set was designed with the operator in mind. Access to commonly used features and functions is made easy through the color touch screen. Below are a few features that illustrate the intuitive nature of the operator interface in the CPA8001 Air Data Test Set:

• Set points for altitude, altitude rate, air speed and airspeed rate are entered by pressing the "setpoint" button within each functional area of the main screen. Pending setpoints are saved and control is initiated only upon acceptance of the setpoint(s) (independently or as a group) by the operator.

• Selectable display configuration can show the Ps, Qc or Pt channel reading in pressure units.

• Control of altitude/altitude-rate and airspeed/airspeed-rate can be initiated independently or simultaneously.

• Previously set preferences are set as default on power up.

• Operator defined named sequences can be saved for standard test procedures.

• "Favorites" button (★) saves frequently used sequences for quick configuration.

For the Engineer / Programmer:
The troubleshooting area provides the Engineer / Programmer with the following information:

• Errors, remote communications command log.

• Emulation of the previous Mensor ADTS or an existing device.

For Calibration:
A password protected area is provided to facilitate calibrate of the sensors while they are installed in the instrument, or the sensors can be removed and calibrated on the remote Calibration Sled (optional). Sensors removed for calibration can be replaced by a freshly calibrated sensor in less than 5 minutes.

• Interchangeable sensors.

• Calibration sled and software for remote calibration of the removable sensor.

• Internal zeroing system for automatic zeroing of the Ps, Pt and Qc Channels.

Instrument Expert
Original factory packaging
www.dorgean.com

Scope of supply

- CPA8001 Air Data Test Set
- Power cable (6 ft.) with plug
- Operating manual
- A2LA accredited calibration certificate

Options

- Barometric reference (for QNH - Barometric adjustment to sea level)
- 19" rack mounting

Accessories

- Remote calibration sled
- Fittings

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

All standard Mensor products are provided with a calibration certificate traceable to NIST. The calibration program at Mensor is accredited to both ISO/IEC 17025:2005 and Z540-1-1994 by A2LA. Mensor is certified to ISO9001:2008.

Represented By:

Mensor
201 Barnes Drive
San Marcos, Texas 78666
Tel.   512-396-4200
Fax   512-396-1820
sales@mensor.com
www.mensor.com