

# Pressure controller air data test set Model CPA8001



WIKA data sheet CT 29.01



for further approvals  
see page 4

## Applications

- Altitude and altitude rate calibration
- Airspeed calibration
- Calibration of air data computers
- Military, commercial, helicopter
- Research and development laboratories

## Special features

- Interchangeable reference sensors that can be changed via the front
- Large colour touchscreen with all necessary information
- Control stability 0.001 % of span
- Accuracy up down to 0.009 % IS-50 (IntelliScale)



Pressure controllers air data test set, model CPA8001

## Description

### Application

The air data test set CPA8001 (ADTS) is a pressure controller specially designed for the calibration of measuring instruments of the aerospace technology. The CPA8001 controller can be used for calibration of both analogue altimeters, rate of climb indicators and speedometers and digital sensors or air data computers. Due to the modular structure of the air data test set model CPA8001, it ensures the greatest possible flexibility for assembly according to customer requirements.

### Design

The CPA8001 is available either as a desktop instrument or as a 19" rack-mounted unit. The instrument is equipped with two control units with the reference pressure sensor CPR8001.

The sensor can be changed via the front, without taking out the complete controller (e.g. out of a calibration rig).

### Functionality

A large, high resolution touchscreen, coupled with an intuitive and user-friendly menu navigation ensures the maximum operating convenience. The menu navigation is available in many languages. On the large touchscreen, all necessary information such as current measured value and set points for altitude, altitude rate, airspeed and acceleration can be found on a single screen. Optionally, the measured values can be also displayed in other pressure units. Moreover, the user can easily create extensive test programs using the instrument menu.

The controller can be remotely controlled via serial interfaces. For this, a wide range of command set emulations of other ADTS instruments are available.

### Complete test and calibration systems

On request, complete mobile or stationary test systems can be manufactured. There is an IEEE-488.2, RS-232, USB and an Ethernet interface for communication with other instruments, and thus the instrument can be integrated into existing systems.

# Specifications

## Model CPA8001

Reference pressure sensor - model CPR8001	
<b>P<sub>s</sub>-Sensor</b>	
Measuring range	0 ... 950 mbar abs. up to 0 ... 1,253 mbar abs. 0 ... 29.5 inHg at 0 °C up to 0 ... 37 inHg at 0 °C
Accuracy 1)	0.009 % IS-50 2)
<b>P<sub>t</sub>-Sensor</b>	
Measuring range	0 ... 1,355 mbar abs. up to 0 ... 3,725 mbar abs. 0 ... 40 inHg at 0 °C up to 0 ... 110 inHg at 0 °C
Accuracy	Standard: 0.01 % FS Optional: 0.01 % IS-50
<b>Q<sub>c</sub>-Sensor</b>	
Measuring range	-34 ... +100 mbar up to -34 ... +3,386 mbar -1 ... +3 inHg at 0 °C up to -1 ... +100 inHg at 0 °C
Accuracy	0.01 % FS
<b>Optional barometric reference</b>	
Function	The barometric reference can be used to switch pressure types 3) (absolute <=> gauge). With gauge pressure sensors, the measuring range of the sensors must begin with -1 bar in order to carry out an absolute pressure emulation.
Measuring range	552 ... 1,172 mbar abs.
Accuracy	0.01 % of reading
<b>Vacuum reference sensor</b>	
Measuring range	100 ... 1,000 mtorr abs.
Accuracy	0.4 % of reading
<b>Pressure units</b>	38 and 2 user defined units
<b>Aviation units</b>	Altitude: feet, miles, meter, kilometer Airspeed units: knots, mph, km/h, meter/s, mach
<b>Integrated sensors</b>	Standard: depending on version, minimum 1 Option: additional barometric reference, vacuum reference sensor

1) It is defined by the total measurement uncertainty, which is expressed with the coverage factor (k = 2) and includes the following factors: the intrinsic performance of the instrument, the measurement uncertainty of the reference instrument, long-term stability, influence of ambient conditions, drift and temperature effects over the compensated range during a periodic zero point adjustment.

2) 0.009 % IS-50 accuracy: Between 0 ... 50 % of the scale range, the accuracy is 0.009 % of the half scale range and between 50 ... 100 % of the scale range, the accuracy is 0.009 % of reading.

3) For a pressure type emulation, we recommend a native absolute pressure sensor, since the zero point drift can be eliminated through a zero point adjustment.

Accuracy		
<b>P<sub>s</sub> Pressure Range</b>	0.009 % IS-50 0 ... 32 inHg abs.	0.009 % IS-50 0 ... 34 inHg abs.
Altitude	Sea Level ±2.5 ft 29,000 ft ±3.4 ft 41,000 ft ±5.7 ft	Sea Level ±2.5 ft 29,000 ft ±3.6 ft 41,000 ft ±6 ft
Pressure	32 inHg ±0.0027 inHg 15 inHg ±0.00014 inHg 5 inHg ±0.00014 inHg	37 inHg ±0.003 inHg 15 inHg ±0.00015 inHg 5 inHg ±0.000115 inHg
<b>Q<sub>c</sub> Pressure Range</b>	0.01 % FS -1 ... 32 inHg	0.01 % FS -1 ... 80 inHg
Airspeed	250 kn ±0.12 kn 500 kn ±0.05 kn 661 kn ±0.03 kn	250 kn ±0.31 kn 500 kn ±0.13 kn 661 kn ±0.08 kn 1,000 kn ±0.03 kn

**Base instrument****Instrument**

Instrument version	Standard: desktop case Option: 19" rack mount kit with side panels
Warm-up time	approx. 25 min
Dimensions	see technical drawings
Weight	approx. 21 kg (46.31 lbs.)

**Display**

Screen	9.0" colour TFT with touchscreen
Resolution	4 ... 6 digits
Input methods	capacitive touchscreen

**Connections**

Pressure connections	7/16"- 20 F SAE
Pressure adapters	6 mm SWAGELOK® threaded pipe connection; others on request
Filter elements	all pressure ports have 20-micron filters
Permissible pressure media	dry, clean air or nitrogen
Overpressure protection	safety relief valve

**Permissible pressure**

Supply Port ( $P_S$ , $P_T/Q_C$ )	~ 110 % FS
Measure/Control Port ( $P_S$ , $P_T/Q_C$ )	max. 105 % FS

**Voltage supply**

Power supply	AC 90 ... 132 V or AC 180 ... 264 V, 47 ... 63 Hz
Power consumption	max. 100 VA

**Permissible ambient conditions**

Operating temperature	15 ... 35 °C (59 ... 95 °F)
Storage temperature	0 ... 70 °C (32 ... 158 °F)
Relative humidity	35 ... 85 % r. h. (non-condensing)
Compensated temperature range	15 ... 45 °C (32 ... 113 °F)
Mounting position	horizontal or slightly tilted



**Control parameters**

Control stability	< 0.001 % FS
Control time	< 25 s; time can be changed by means of rate control
Control range	0 ... 100 % FS
Rate control	0 ... 6,000 ft/min.
Stability of the rate control	±0.8 % of the set rate ±10 ft/min
External volume	50 ... 1000 ccm / 3 ... 60 cu.in.

**Communication**

Interface	RS-232, Ethernet, IEEE-488.2 and USB
Command sets	Mensor, WIKA SCPI
Response time	approx. 100 ms

## Approvals

Logo	Description	Country
	<b>EC declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive 2004/108/EC 4)</li> <li>EN 61326-1 emission (group 1, class A) and interference immunity (industrial application)</li> <li>■ Low voltage directive 2006/95/EC, EN 61010-1</li> </ul>	European Community
	<b>EAC</b> <ul style="list-style-type: none"> <li>■ Electromagnetic compatibility</li> <li>■ Low voltage directive</li> </ul>	Eurasian Economic Community
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan

4) **Warning!** This is class A equipment for emissions and is intended for use in industrial environments. In other environments, e.g. residential or commercial installations, it can interfere with other equipment under certain conditions. In such circumstances the operator is expected to take the appropriate measures.

## Certificates

Certificate	
<b>Calibration 5)</b>	Standard: 3.1 calibration certificate per DIN EN 10204 Option: DKD/DakKS calibration certificate
<b>Recommended recalibration interval</b>	1 year (dependent on conditions of use)

5) Calibration in a horizontal position.

Approvals and certificates, see website

## Modular design of the CPA8001

### Accuracy and stability

The total measurement uncertainty of CPA8001 complies with the RVSM directive. Thanks to special, patented valve technology, altitudes or altitude rates as well as airspeed at large volumes can be controlled precise and stable.

### Interchangeable sensors

The interchangeable sensors are a special feature of the Mensor calibration instruments. Interchangeable sensors guarantee long-term operation with practically no downtime. Sensors removed for calibration can be replaced by freshly calibrated sensors in less than three 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.

### Emulation and drop-in compatibility

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

### Modular design

Modular design simplifies maintenance. The electronic module and the controller are stand-alone assemblies that require no maintenance. Should, however, maintenance be necessary, each component can be removed and easily replaced with a new assembly.



Modular parts of the hardware (Sensor CPR8001)

## Special features of the CPA8001

### Outstanding control performance

The CPA8001 (ADTS) air data test set convinces particularly with outstanding control performance. The control unit guarantees fast, harmonic and overshoot-free control of pressure values with the highest precision and a very high control stability.

### Particularly adaptable to any application

The controller has a short warm-up time of approx. 25 minutes. In addition, it can be automatically adapted to the test volume.

### Simple operation

The lean and unambiguous menu structure ensures a particularly high user-friendliness.

### Long-term stability and low maintenance

As a result of the high-quality precision pressure sensor technology, the instrument offers an excellent measuring accuracy and long-term stability. Furthermore, special patented needle valve technology ensures a low-noise and low-wear control of pressure.

### 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 ( $P_s/P_t$  or  $P_s/Q_c$ ) pressure sensor CPR8001 can be removed by loosening a thumb screw and lifting it out of its captive cradle.

The CPR8001 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.

An additional dual pressure sensor can also be purchased in order to have a reserve pressure sensor with a fresh calibration on hand to immediately replace the pressure sensor requiring calibration. This feature virtually eliminates downtime for the operation of the CPA8001 air data test set.

## Touchscreen and intuitive operator interface

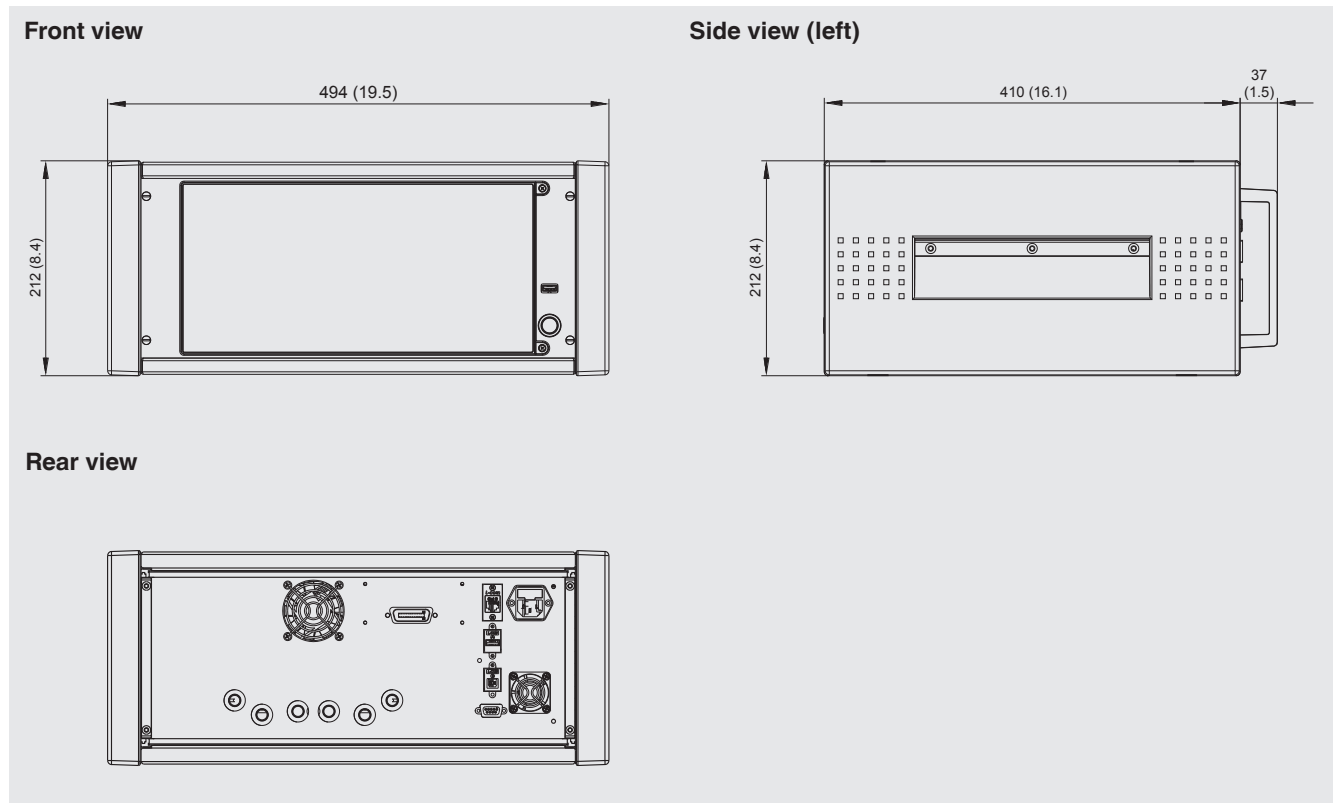
The CPA8001 (ADTS) air data test set has a high definition colour touchscreen with an intuitive menu structure and job specific screens. Each user level is password protected. Set points for altitude, altitude rate, airspeed and airspeed rate are initially in a pending state and can be activated simultaneously.

### Standard desktop / main screen

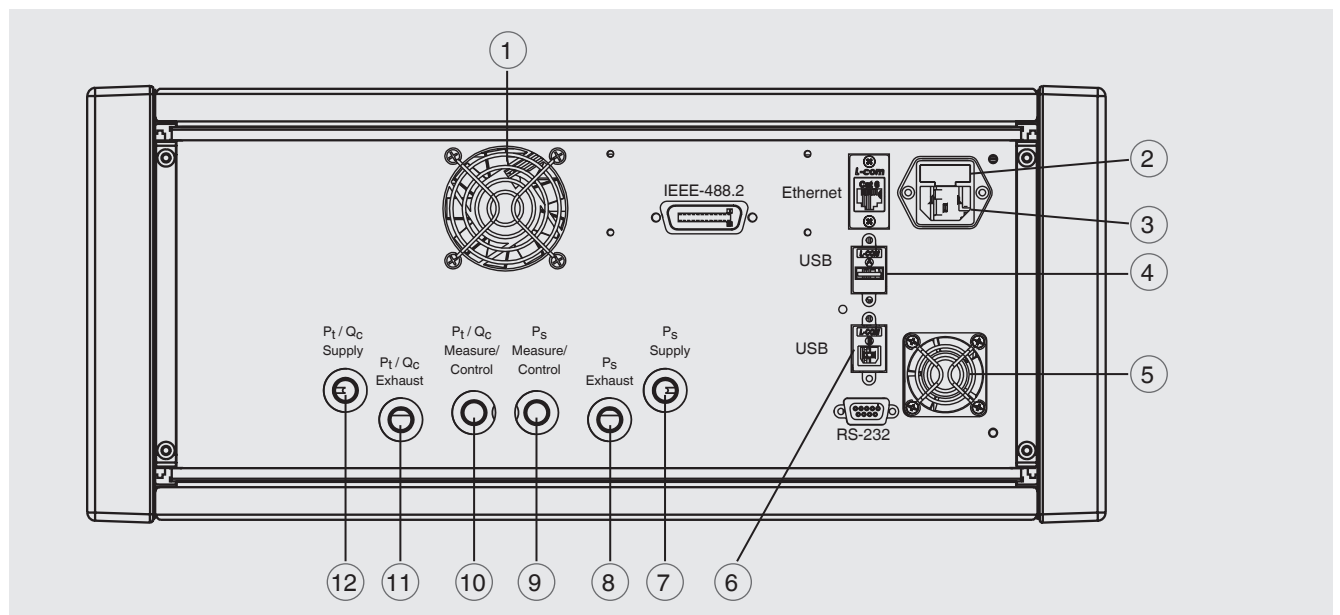


- |   |  |
|---|--|
| ① Frame for $P_T/Q_C$ channel   | ⑬ Operating modes                        |
| ② Set point (airspeed)  | ⑭ Current altitude rate in pressure unit |
| ③ Current measuring value (airspeed)  | ⑮ Current unit (slew rate)               |
| ④ Current unit (airspeed)   | ⑯ Current measuring value (slew rate)    |
| ⑤ Current airspeed (pressure unit)  | ⑰ Set point (slew rate)                  |
| ⑥ Frame for acceleration  | ⑱ Frame for altitude rate                |
| ⑦ Set point (acceleration)  | ⑲ Current altitude in pressure unit      |
| ⑧ Current measuring value (acceleration)  | ⑳ Current unit (altitude)                |
| ⑨ Current unit (acceleration)   | ㉑ Current measuring value (altitude)     |
| ⑩ <b>VENTING (Go to ground)</b><br>The instrument controls by a user adjustable altitude rate the system, including the test set-ups to the atmosphere that are connected to the test port.   | ㉒ Set point (altitude)                   |
| ⑪ <b>CONTROL</b><br>In control mode the instrument provides a very precise pressure at the test port of the respective channel in accordance with the desired value setting.  | ㉓ Frame for $P_S$ channel                |
| ⑫ <b>MEASURE</b><br>In measure mode, the pressure present at the test port is measured with high accuracy (if you switch directly from <b>CONTROL</b> to <b>MEASURE</b> mode, the last controlled pressure in the connected test assembly will be maintained/locked). | ㉔ General settings                       |
|   | ㉕ Input via numerical keypad             |
|   | ㉖ Favourites settings                    |

## Dimensions in mm (in)



## Electrical and pressure connections - rear view



- |   |                                  |
|---|----------------------------------|
| ① Fan   | ⑦ Supply port $P_s$              |
| ② Microfuse   | ⑧ Exhaust port $P_s$             |
| ③ Power supply  | ⑨ Measure/Control port $P_s$     |
| ④ USB interface (host) for service                    | ⑩ Measure/Control port $P_t/Q_c$ |
| ⑤ Fan   | ⑪ Exhaust port $P_t/Q_c$         |
| ⑥ USB interface (instrument) for remote communication | ⑫ Supply port $P_t/Q_c$          |

## Scope of delivery

- Air data test set controller model CPA8001
- Approx. 2 m (6 ft) power cord
- Operating instructions
- 3.1 calibration certificate per DIN EN 10204

## Options

- Reference pressure sensor model CPR8001
- DKD/DAkkS calibration certificate
- 19" rack mounting with side panels
- Barometric reference

## Accessories

- Calibration sled
- Pressure adapters
- Interface cable

## Ordering information

Model / Type of housing / Reference pressure sensor / Barometric reference / Barometric reference calibration / Vacuum reference sensor / Vacuum reference sensor calibration / Power cord / Pressure connection adapter / Additional order information

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