

Pressure controller air data test set Model CPA8001

mentor

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 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	
P_S-Sensor	
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)
P_T-Sensor	
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
Q_C-Sensor	
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
Optional barometric reference	
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
Vacuum reference sensor	
Measuring range	100 ... 1,000 mtorr abs.
Accuracy	0.4 % of reading
Pressure units	38 and 2 user defined units
Aviation units	Altitude: feet, miles, meter, kilometer Airspeed units: knots, mph, km/h, meter/s, mach
Integrated sensors	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		
P_S Pressure Range	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
Q_C Pressure Range	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 _f /Q _c)	~ 110 % FS
Measure/Control Port (P _s , P _f /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
	EC declaration of conformity <ul style="list-style-type: none"> ■ EMC directive 2004/108/EC 4) EN 61326-1 emission (group 1, class A) and interference immunity (industrial application) ■ Low voltage directive 2006/95/EC, EN 61010-1 	European Community
	EAC <ul style="list-style-type: none"> ■ Electromagnetic compatibility ■ Low voltage directive 	Eurasian Economic Community
-	MTSCHS 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	
Calibration 5)	Standard: 3.1 calibration certificate per DIN EN 10204 Option: DKD/DAkkS calibration certificate
Recommended recalibration interval	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 adopted 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

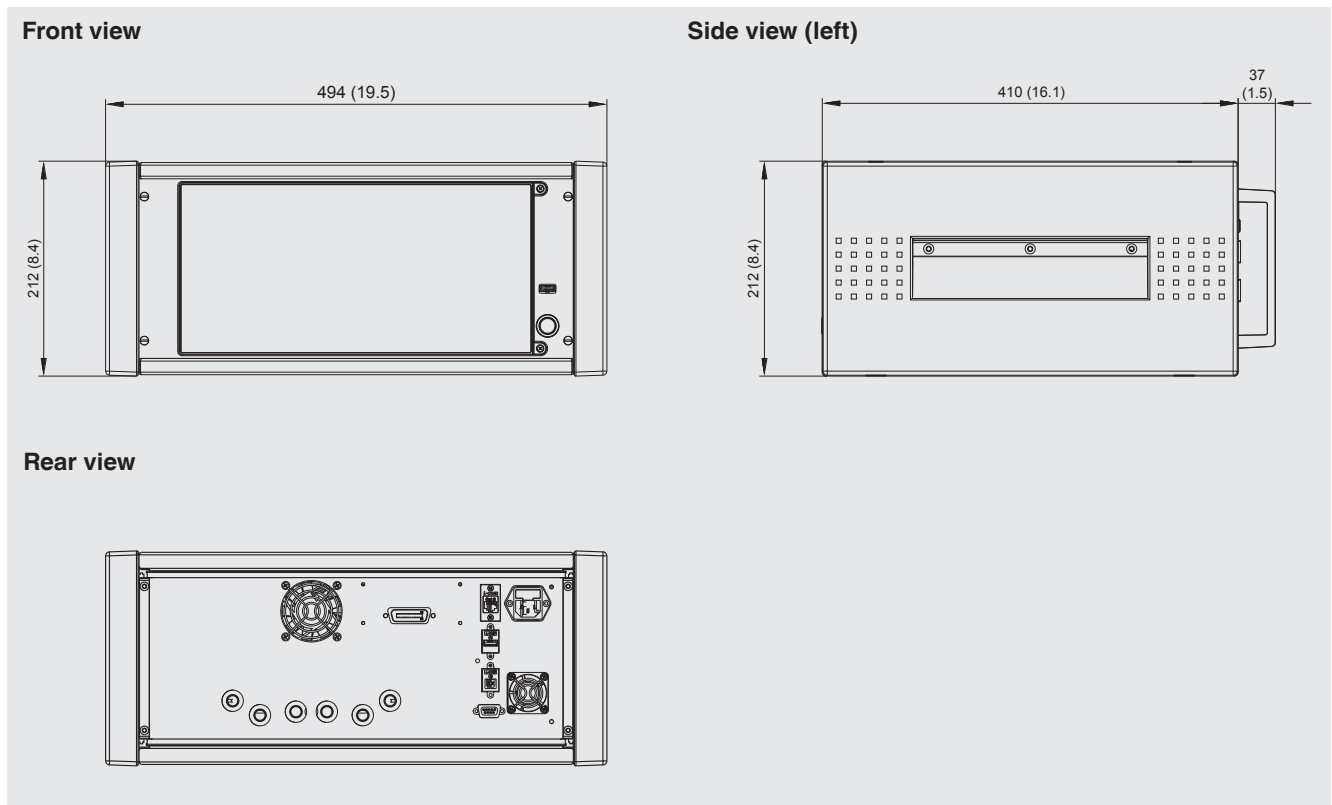
The CPA8001 (ADTS) air data test set has a high definition colour touchscreen with an intuitive menu structure and job specific screens. Each user level is password protected. Set points for altitude, altitude rate, airspeed and airspeed rate are initially in a pending state and can be activated simultaneously.

Standard desktop / main screen

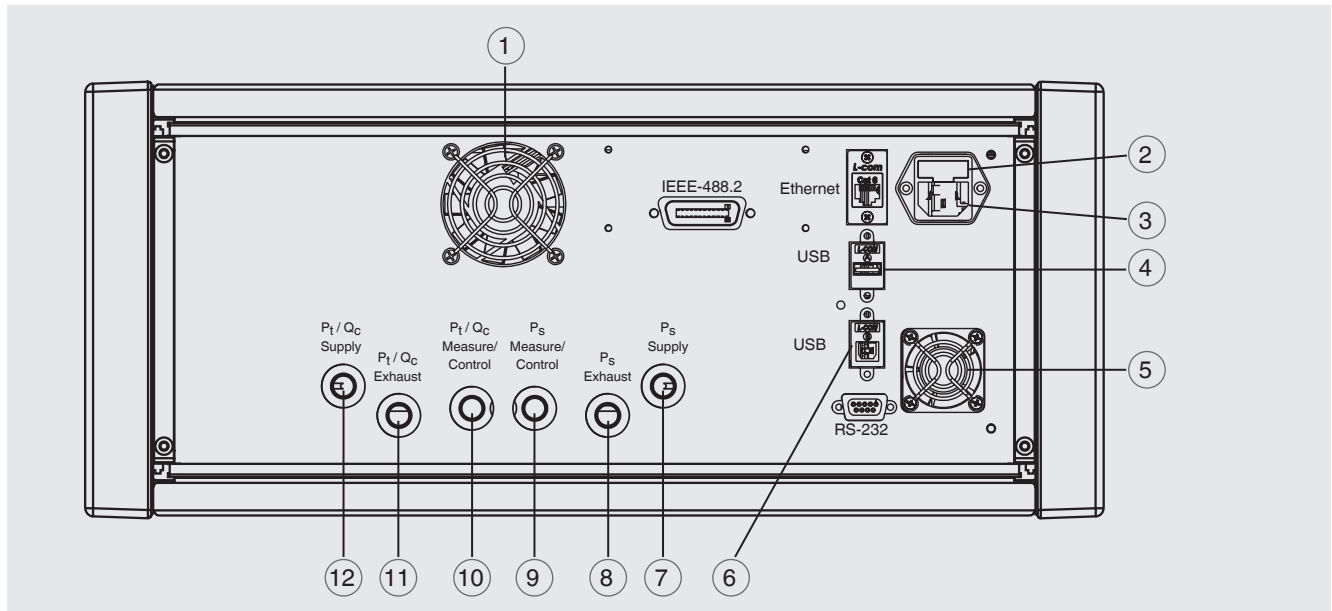


- | | |
|---|--|
| ① Frame for P_t/Q_c channel | ⑬ Operating modes |
| ② Set point (airspeed) | ⑭ Current altitude rate in pressure unit |
| ③ Current measuring value (airspeed) | ⑮ Current unit (slew rate) |
| ④ Current unit (airspeed) | ⑯ Current measuring value (slew rate) |
| ⑤ Current airspeed (pressure 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 VENTING (Go to ground)
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 CONTROL
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 MEASURE
In measure mode, the pressure present at the test port is measured with high accuracy (if you switch directly from CONTROL to MEASURE 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

© 2015 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.