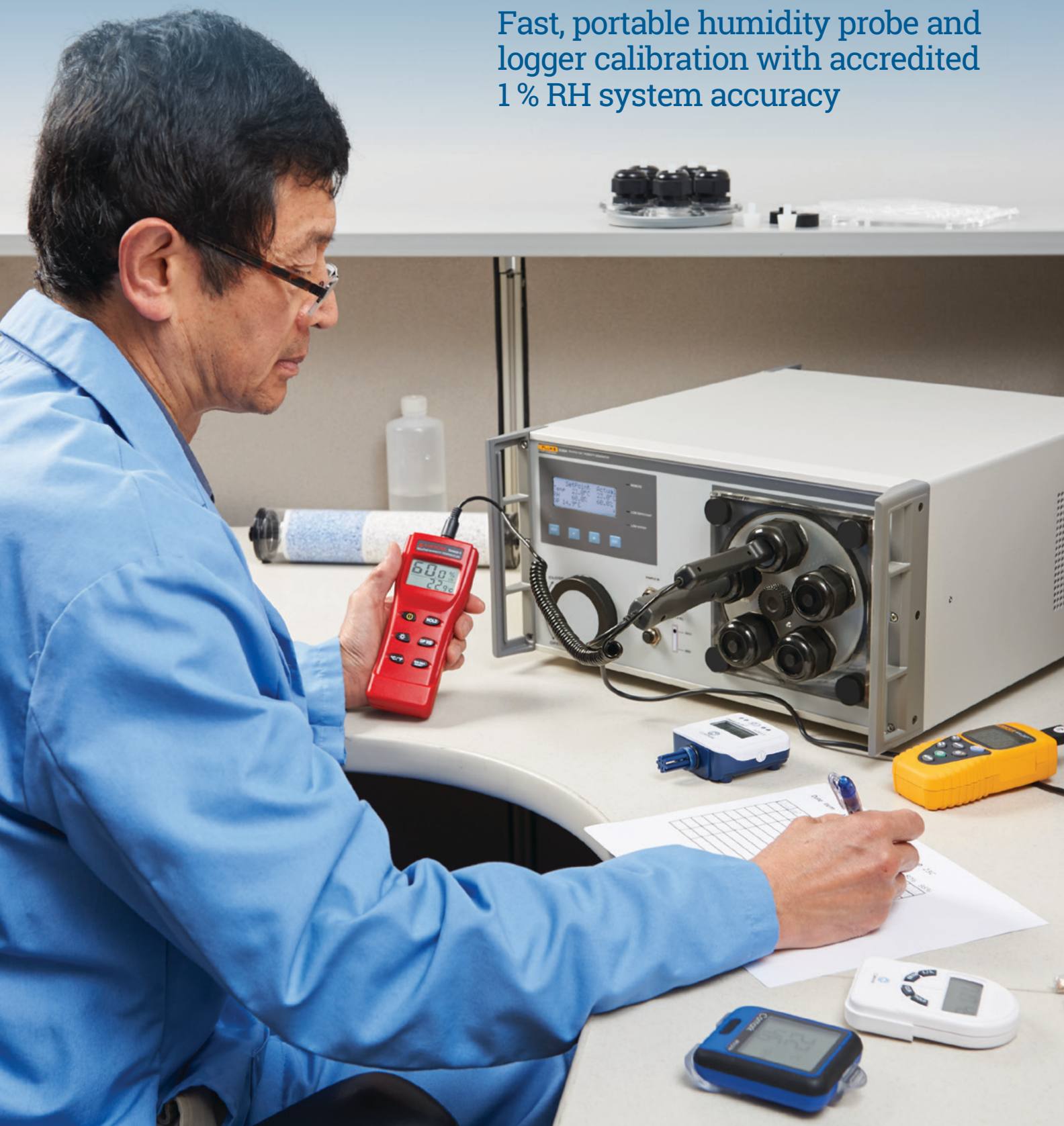
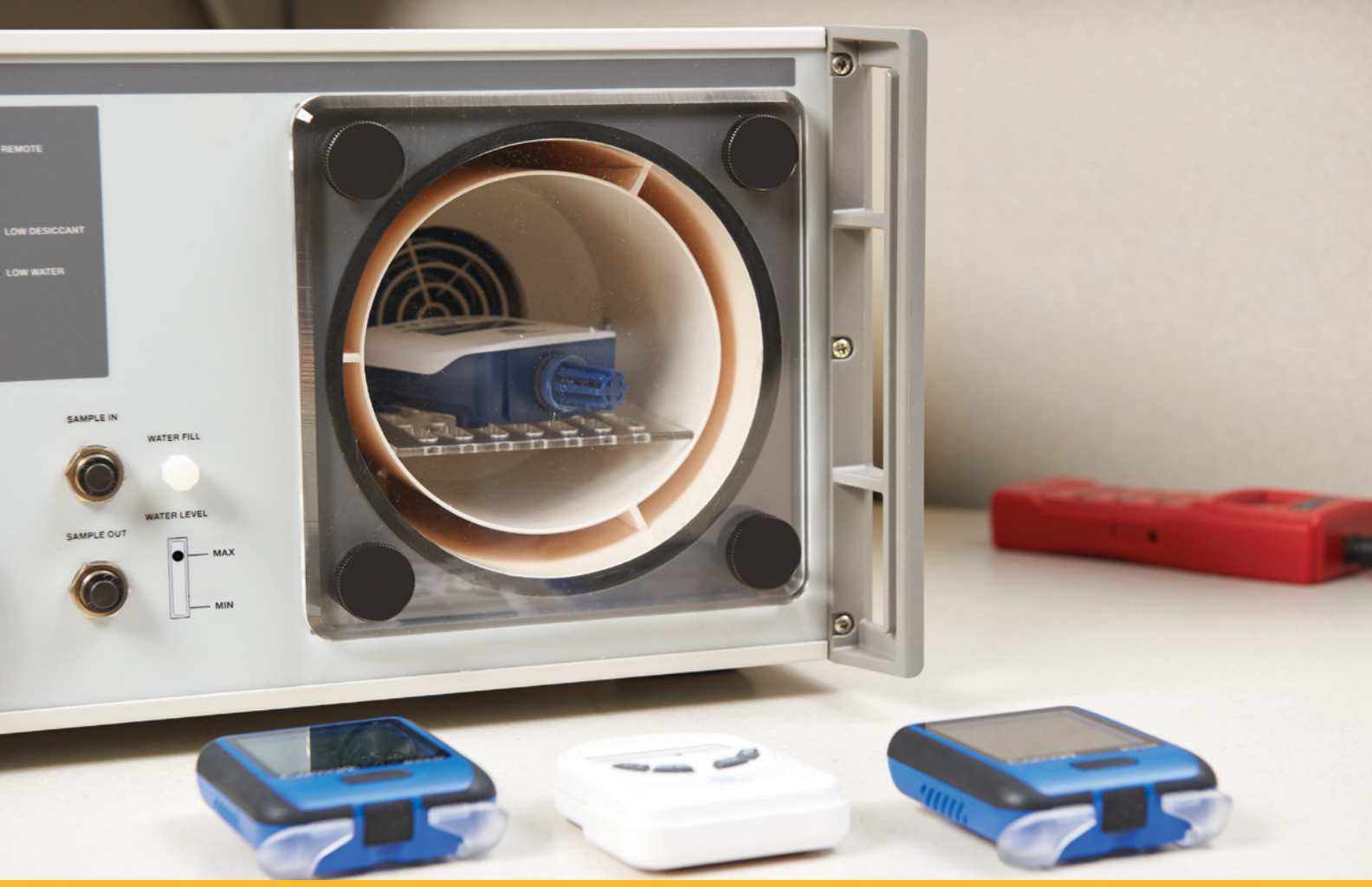
FLUKE®
Calibration

5128A
RHapid-Cal Humidity Generator

Fast, portable humidity probe and logger calibration with accredited 1 % RH system accuracy





Humidity calibration in the laboratory or on-site in the field

The Fluke Calibration 5128A RHapid-Cal Humidity Generator is a portable humidity generator for calibrating a large workload of probes in the laboratory or on-site in the field. It is used by corporate calibration/research labs and independent calibration labs where humidity measurement is critical to prevent spoilage of products in industries including pharmaceuticals, medical devices, semiconductors, chemicals, and food production.

In the lab, the 5128A calibrates humidity probes 33 % faster than a two-pressure generator.

In the field, the 5128A provides more thorough, reliable multi-point calibrations than one-point spot checks using handheld humidity meters.

The 5128A RHapid-Cal is backed by Fluke Calibration's world-class metrology and support. The 5128A comes standard with an ISO 17025 accredited system calibration. Support offerings include online chat, email, phone, and product service from Fluke Calibration, channel partners and authorized service centers around the world.

5128A overview

Display shows set points and actual temperature and humidity, plus the calculated dew point. Soft keys on the control panel make it easy to cycle through the command menu.

Mixing insert causes the air to circulate for better temperature and humidity uniformity inside the insert.

Desiccant cap provides easy, front-panel access to desiccant cartridge.

Sample In/Out port draws and returns gas to the working chamber. Used to measure the chamber's dew point with a chilled mirror instrument.

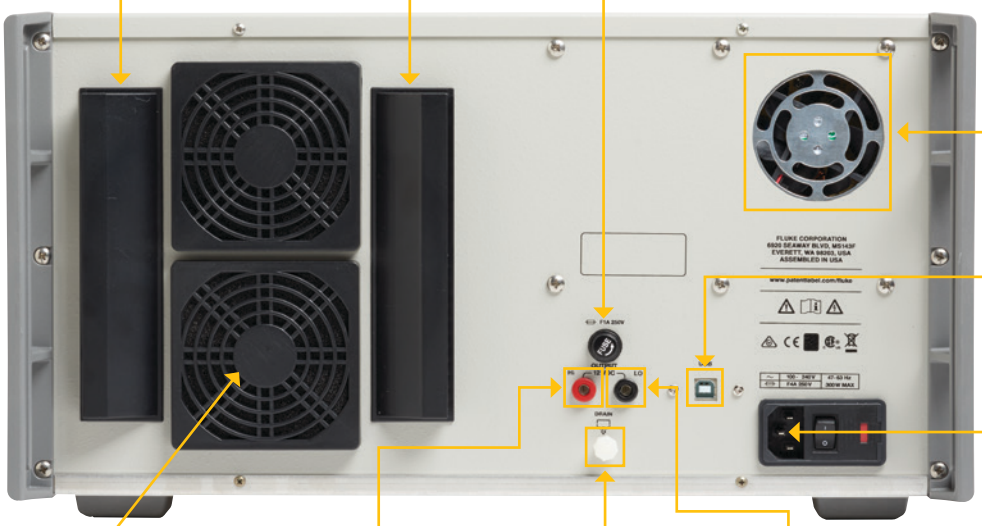
Fill inlet for filling the humidity generator with distilled water. Water level indicator shows the relative amount of water in the generator.

Chamber door provides access to the working chamber. Different door types are available.

Working chamber which holds the mixing insert. A unit under test can be placed directly in the working chamber without the mixing insert if the temperature and humidity are monitored with an external reference probe.

Inlet/outlet holes and fan filters.

12 V dc output fuse.



Power supply fan access holes provide cooling for the internal power supply.

USB Type B connector for operating the 5128A via remote control.

Mains power cord receptacle and holder for mains fuses.

Two fans provide internal cooling to the 5128A.

HI terminal for 12 V dc output to power up transmitters and transducers.

Drain plug for the 5128A.

LO terminal for 12 V dc output.

Seven key features of the 5128A RHapid-Cal Humidity Generator

1 Best-in-class system accuracy for dependable humidity probe calibration

The 5128A RHapid-Cal offers a best-in-class humidity system accuracy of ± 1.0 % RH (7 % to 80 % RH, 18 °C to 28 °C) which includes all known sources of error such as stability, uniformity, drift, and calibration uncertainty. Calibrate with confidence using an instrument with comprehensive specifications. Most competing generators don't specify system accuracy. Their specifications can be complicated and confusing, making it difficult to know how to apply them to a particular calibration process.

The 5128A also provides the flexibility to improve calibration uncertainty by using an external humidity reference such as a chilled mirror hygrometer.

2 Rapid humidity and temperature stabilization time for high calibration throughput

The materials and air flow design used in the 5128A RHapid-Cal are selected to ensure that response time to a humidity or temperature step change is fast. Rate of change for temperature increase is typically 10 °C/minute and for temperature decrease is 1.5 °C/minute. Rate of change for humidity increase is typically 10 % RH/minute and for humidity decrease is 5 % RH/minute. A six-point calibration can be done in two hours using the 5128A RHapid-Cal. In contrast, a two-pressure humidity generator takes longer to respond to humidity or temperature changes. A similar six-point calibration with a typical two-pressure generator would take more than three hours.

3 Supports on-site, multi-point calibration of humidity probes

Spot-check or one-point probe calibration using a handheld humidity meter in the field is convenient, but limited in value. Calibration with a handheld meter needs to be carefully managed. Temperature differences between the probe and its environment, technician body heat, and moisture from breath can all cause RH measurement errors. Further, one-point tests may cause out-of-tolerance readings when ambient conditions change. Using the 5128A RHapid-Cal for a multi-point calibration gives a more reliable test and truer characterization of how a humidity probe actually operates over its working range in the field.

4 Versatile design accommodates a large workload

A large variety of humidity sensors can be accommodated in the 5128A test chamber. The 5128A comes with a five-port door for calibrating up to five RH probes, meters, and transmitters at a time. An optional transparent door with a shelf is available. Data loggers are placed on the shelf inside the chamber for calibration. The mixing insert can be removed to accommodate larger devices in the chamber.

5 Compact size and lightweight for easy transport

The 5128A RHapid-Cal measures 237 mm high x 432 mm wide x 521 mm deep (9.3 in x 17 in x 20.5 in) and weighs just 15 kg (33.06 lbs). It can be easily carried to any desired bench space in the lab or transported on-site to a field work location. Its front-loading internal desiccant cartridge design adds convenience and ruggedness. In comparison, a two-pressure humidity generator is practically limited to laboratory use because of its large size. It includes a generator, compressor, and supporting equipment. A "small" two-pressure generator requires about eight times the space that the 5128A RHapid-Cal does and weighs about four times as much. The 5128A RHapid-Cal is easily placed on a small cart for plant-wide transport and a convenient wheeled transport case is offered for shipment or transport to on-site calibrations.

6 ISO 17025 accredited system calibration included standard

Prior to shipment, each 5128A RHapid-Cal receives an accredited system calibration by Fluke of the humidity chamber with its internal reference probe, using a chilled mirror hygrometer as the reference standard. This system calibration provides the assurance that the 5128A and its internal reference probe have been optimized for the best performance when they leave the factory. In contrast, some humidity generator suppliers only provide a reference probe calibration, but not a complete system calibration that ensures uniformity and accuracy delivered at the location of your device under test.

7 Easy to maintain

The 5128A RHapid-Cal uses a mixed-flow method to generate relative humidity. A desiccant cartridge provides a source of low humidity and an internal humidifier generates high humidity. A display light indicates when the desiccant cartridge needs to be replaced. The 5128A front-loading internal desiccant cartridge design adds convenience and ruggedness. The desiccant cartridge can be easily changed by removing the front cap and sliding in a new one.

Only clean distilled water is needed to operate the 5128A RHapid-Cal. Compressed air or other additional fluids are not required. A water level indicator on the front panel shows status of water level in the humidity generator. When the water level falls below the minimum level, use clean distilled water to fill the reservoir.

No special shut-down routines are required after use, so you can move on to the next job quickly.

General specifications

General specifications	
AC mains voltage	100 V to 240 V ± 10 %
Standard frequency range	47 Hz to 63 Hz
Power consumption	300 VA
Required test fluid	Distilled water
Warm-up period	Twice the time since last warmed up, to a maximum of 30 minutes
Mains fuse rating	F 4A 250 V (fast blow)
Operating ambient relative humidity range, 18 °C to 28 °C	Up to 80 % RH
Storage temperature and relative humidity	-20 °C to 50 °C, 0 % to 95 % RH, non-condensing
Transducer power output	12 V dc, 1 A maximum, fuse: F 1A 250V (fast blow)
Computer interface	USB
Safety	IEC 61010-1, Installation Category II, Pollution degree 2, Indoor use only
Altitude	2000 m
Electromagnetic compatibility (EMC)	
International	IEC 61326-1: Controlled electromagnetic environment *CISPR 11: Group 1, Class A* *Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.* *Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.*
Korea (KCC)	Class A Equipment (Industrial, broadcasting, and communication equipment) *Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.*
USA (FCC)	47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.
Weight	
Chassis only	15 kg (33.06 lbs)
Dimensions	
Chassis	237 mm × 432 mm × 521 mm (9.3 in × 17 in × 20.5 in) (height × width × depth)
Overall chamber dimensions	200 mm (7.87 in) (depth) x 150 mm (5.90 in) (diameter)
Working volume dimensions	109 mm (4.3 in) (depth) x 125 mm (4.92 in) (diameter)
Temperature resolution	
Display	0.1 °C
USB data	0.1 °C
Humidity resolution	
Display	0.1 % RH
USB data	0.1 % RH
Dew point	
Resolution	0.1 °C (for indication only)

Note: The displayed dew point reading (DP) is calculated from the Product's actual temperature and % RH readings. It is calculated as a dew point (water vapor over water) over the entire range, regardless if dew point is equal to or lower than 0 °C, and at a nominal pressure of 101.325 kPa (1 atmosphere).

Humidity and temperature chamber technical specifications

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Calibration

The Product specifications describe the Absolute Instrumental Uncertainty of the Product. The Product specifications include stability, ambient temperature, and humidity (within specified limits), linearity, line regulation, the reference standard measurement uncertainty and long term stability of one year. The product specifications are provided at a 99 %, k=2.58, normally distributed level of confidence, unless otherwise noted.

Chamber specifications

One year, ambient temperature range 23 °C ± 3 °C[1]

Chamber temperature range	Chamber humidity range	Humidity specification	Temperature specification
18 °C to 23 °C	7 % to 80 % RH >80 % to 95 % RH	± 1.0 % RH ± 1.25 % RH	± 0.2 °C ± 0.2 °C
>23 °C to 28 °C	7 % to 80 % RH >80 % to Hmax[2] % RH	± 1.0 % RH ± 1.25 % RH	± 0.2 °C ± 0.2 °C

[1] For ambient conditions of 23 °C ± 5 °C, multiply the specifications by 1.5.
[2] Hmax is the maximum humidity value at which the specification applies. See the Chamber Operational Limits graph below for Hmax.
Note: Specifications apply to the Working Volume shown in the Working Volume Template found at the end of the Operators Manual, and is referenced to the "Actual" reading on the Product display.

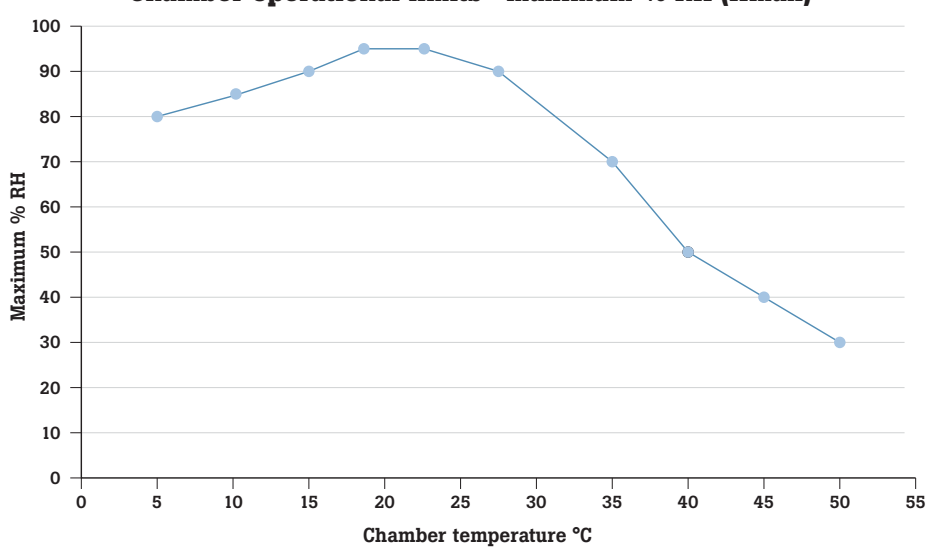
Chamber uniformity and stability

Ambient temperature range: 23 °C ± 3 °C[1]

Chamber temperature	Chamber humidity range		Chamber temperature uniformity[2]	Chamber humidity uniformity[2]	Chamber humidity stability[3]	Chamber temperature stability[3]
	Min RH	Max RH				
18 °C to 28 °C	7 %	See chamber operational limits below	± 0.12 °C	± 0.3 % RH	±0.15 % RH	± 0.05 °C
The following specifications are typical for chamber conditions shown[4]						
5 °C to <18 °C[5]	15 %	See chamber operational limits below	± 0.5 °C	± 1.5 % RH	± 0.5 % RH	± 0.5 °C
>28 °C to 30 °C	7 %		± 0.2 °C	± 0.6 % RH	± 0.3 % RH	± 0.2 °C
>30 °C to 35 °C	7 %		± 0.3 °C	± 0.9 % RH	± 0.4 % RH	± 0.3 °C
>35 °C to 40 °C	7 %		± 0.5 °C	± 1.5 % RH	± 0.5 % RH	± 0.5 °C
>40 °C to 50 °C	7 %		± 0.5 °C	± 1.5 % RH	± 0.5 % RH	± 0.5 °C

[1] For ambient conditions of 23 °C ± 5 °C· multiply the specifications by 1.5.
[2] Defined as the uniformity of the Working Volume.
[3] Defined as 1-sigma standard deviation of measurement readings over a 5-minute span.
[4] Chamber humidity uniformity is listed for mid-level humidity settings. Lower humidity settings will give better uniformity while higher humidity settings will give worse uniformity.
[5] The chamber control range is 5 °C to 50 °C. Achievable low temperature may be limited to 15 °C below ambient dependent upon stabilization time and temperature and humidity settings.

Chamber operational limits—maximum % RH (Hmax)



Operational specifications

Temperature rate of change—down	1.5 °C/minute (typical)
Temperature rate of change—up	10 °C/minute (typical)
Humidity rate of change—down	5 % RH/minute (typical)
Humidity rate of change—up	10 % RH/minute (typical)

Ordering Information

Models

5128A	RHapid-Cal Humidity Generator with one Square 5-Port Door, one Desiccant Cartridge, one Fill Syringe with Extension Tube, five Grommets (one each of 1/4 inch, 3/8 inch, 1/2 inch, 3/4 inch, 7/8 inch sizes), one Mains Power Cord 2-meter, Fluke ISO 17025 Accredited System Calibration, 115 V ac/230 V ac

Accessories

5128-2680	Desiccant Cartridge (including desiccant material)
5128-2681-R5	Round Door, 5 ports
5128-2681-S0	Square Door, clear with shelf
5128-2681-S5	Square Door, 5 ports (spare)
5128-CASE	5128A Case with wheels
5128-2682-1/4	Port Grommets, 1/4 inch, 5 each
5128-2682-3/8	Port Grommets, 3/8 inch, 5 each
5128-2682-1/2	Port Grommets, 1/2 inch, 5 each
5128-2682-3/4	Port Grommets, 3/4 inch, 5 each
5128-2682-7/8	Port Grommets, 7/8 inch, 5 each
5128-2683	Port Plugs, 5 each
5128-2684	Fill Syringe with Extension Tube

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Fluke Calibration
PO Box 9090,
Everett, WA 98206 U.S.A.

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands
Web access: http://www.flukecal.eu

For more information call:
In the U.S.A. (877) 355-3225 or Fax (425) 446-5716
In Europe/M-East/Africa +31 (0) 40 2675 200 or Fax +31 (0) 40 2675 222
In Canada (800)-36-FLUKE or Fax (905) 890-6866
From other countries +1 (425) 446-6110 or Fax +1 (425) 446-5716
Web access: http://www.flukecal.com

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